

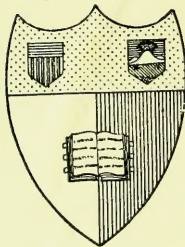
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Bee-books by John Keys.

The Practical Bee-master.

8^{vo}. London 1780

The Antient Bee-master's Farewell.

8^{vo} London 1796

A Treatise on the Breeding and
Management of Bees to the greatest
advantage.

8^{vo} London 1814.

THE
Antient Bee-Master's Farewell;

OR,

FULL AND PLAIN DIRECTIONS

FOR THE

Management of Bees to the greatest Advantage;

DISCLOSING

FURTHER IMPROVEMENTS

OF THE

HIVES, BOXES, AND OTHER INSTRUMENTS, TO
FACILITATE THE OPERATIONS;

*Especially that of SEPARATING Double and Treble Hives or Boxes,
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"Multum in Parvo."

By JOHN KEYS, OF BEE-HALL, NEAR PEMBROKE.

LONDON:

PRINTED FOR G. G. AND J. ROBINSON,
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1796.

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P R E F A C E.

IMPROVEMENTS in the management of Bees, among farmers and cottagers, have been but little advanced, notwithstanding the *many* ingenious contrivances which have been offered to public notice; probably from being too *operose* and *expensive* for people of that description, to whom, in common, the management of bees is generally of trifling concern.

Whether my present attempt will succeed better, time must decide. My utmost exertions have been directed to the remedy of the defect; which, it is hoped, I have greatly *advanced*, if not perfected as far as our unfavourable climate will admit.

Additional profits, in most cases, are unavoidably attended with some increase of

expence. But from the *impartial estimate* I have stated (page 60), it will be ascertained, that the management there proposed far overbalances the extra expence, and therefore will merit the adoption of Beekeepers, and, perhaps, the patronage of Agricultural Societies.

By persons of a higher class a trifle of additional expenditure will not be regarded, in comparison of the convenience and safety with which the operations may be effected : to say nothing of the gratification of philosophic curiosity, together with superior profit.

Near the close of the year 1780, I ventured to publish a work of this kind, according to the best of the knowledge and experience I had then attained. Since that time, having no avocation to withdraw my attention from my *favourite pursuit*, and encouraged by the favourable reception of that work, I now, in the vale of life, submit this treatise, as the *result* of all my researches ; drawn from a much longer and more assiduous experience, and from a cooler judgment, ripened by numberless experiments, which have led me to *new* observations and improve-

improvements, and to *differ* also not more from *myself* than from ALL OTHERS.

Instead of a second edition of my former publication, a *new* book became necessary, as most part of my present management is on a different plan; and much tautology and superfluity of matter demanded curtailings, and a more judicious arrangement of the whole.

No article inculcated in these pages is advanced without its being warranted by my own experience, unbiassed by any author, however otherwise respectable. Where I am still dubious, it is so expressed.

Apiators may be assured that, to the best of my knowledge, every information or hint that has been found of any *real* service, in any Writer of Note, Foreign or Domestic*, is *comprised in this volume*.

As my present design is *wholly for practitioners*, the bulk and price is accommodated to the purpose of becoming generally use-

* Butler, Mew, Geddy, Purchase, Wolridge, Ruffen, Warder, White, Thorley, Mills, Wildmans, Debbrow, and Broomwich. Foreigners; Miraldy, Reaumur, Bonnet, Schirach, Needham, Norton, Seykers, and others of less note.

ful; and consequently precludes the Natural History of Bees*, except in some small degree, as far as necessary to their management.

A few years since, warm disputes arose between different naturalists and apiarian societies on the continent, relating to the *generation of bees*, and the formation of *artificial swarms*, in consequence of some *new and wonderful* principles advanced by a Mr. Schirach (secretary of an apiarian society), in his treatise entituled “*Histoire Naturelle de la Regne des Abeilles*,” &c. translated into French by J. Blaffiere, Hague, printed 1771†.

Counter-experiments were made by Needham, Rheim, and others‡, with results of an opposite nature.

It being incompatible with the design of this work to enter into details, or a formal

* See a judicious book with that title, being a compilation from the French, published by Knapton 1744.

† This book I had the honour of having presented me by the late *Earl of Marchmont*.

‡ Brussels Memoirs, vol. ii. 1780, presented me by *Thomas Dilks, Esq.* to whom I render my thankful acknowledgments.

refutation of Schirach's doctrine, I shall only briefly declare, that at first I was strongly prejudiced in its *favour*, and urged thereby to pursue a series of experiments according to his directions, with the most scrupulous exactness and care, for eight years, but without a SINGLE RESULT in confirmation of his scheme. I diversified the experiments, and also invented a more suitable apparatus to perform them, yet still met with the same lamentable disappointment. In this pursuit many bees and many stocks were unavoidably ruined, besides an accumulation of vexation and trouble. But my anxiety to acquire so desirable an end urged me beyond the bounds of prudence. I hope vanity will not be imputed to the declaration and inference, that if one of long experience in the handling of bees, and having every conveniency, yet could not, in so many trials, succeed, it is more than probable that others, with only common knowledge, and destitute of a proper apparatus, will not be more successful, and consequently that Schirach's method cannot prove of public utility.

The

The most likely means to *establish* the BEE ART, I believe, will not be accomplished without the PATRONAGE of *Agricultural Societies*; namely, the encouraging a proper person or persons to exhibit in the *bee season* the most *approved method* through the chief market towns of the kingdom. The person must be capable of explaining the processes, and have with him the necessary instruments.

I would also *recommend* this employment to any ingenious young man, properly qualified, and provided with the apparatus, as a practice that most likely would turn to much advantage; taking care *not* to introduce tricks and fancies, as some have done, to the *destruction of multitudes of bees*, instead of exhibiting any real improvements.

Or, if *such* persons, resident in villages, would qualify themselves, they might, even in their limited stations, exercise the art to their own benefit and that of the neighbourhood, by performing it at a *stated rate*.

Rural Curates might considerably augment their too frequently *niggardly* stipends,
by

by the cultivation of bees, and act at the same time consonantly with their clerical profession, as it is an innocent amusement, both *healthy* and *profitable*.

Farmers and others who keep numerous stocks of bees cannot be supposed to attend so minutely to every particular as those who have not many, and have more leisure; yet in this, as well as in all the other articles of husbandry, the greater the care bestowed, the greater the return that usually follows. Besides, most of the operations on bees are to be performed in the evening, or early in the morning, and therefore will not interfere with more important business.

To avoid repetitions, the *manner of performing the operations* must be severally learnt from the *second part*, to the particulars of which the Index will direct.

The first part contains the principles; the second the manual, or operative part.

In general, I have used the word *bive* indiscriminately for *bive* or *box*, as applicable to either; except when it is otherwise expressed, or is self-evident.

The

The writer submits these pages to the candour of the learned, under a consciousness of his own inabilities for the task ; but if it affords *useful* improvements in the *art*, he hopes it may be pleaded in excuse of his presumption.

JOHN KEYS.

Bee-Hall, near Pembroke,

1796.

EXPLA-

EXPLANATION OF TERMS.

ADAPTER, a Board to set Glasses on.

Apiary, the Place or Spot where Bees are kept.

Apiator, the Person who manages the Bees.

Bee-Herd, the Person who watches the rising of Swarms.

Casts, second, third, &c. Swarms.

Deprivation, the Separation, or Taking of the Hives of Honey.

Divider, the Brass Plate used in separating Hives.

Duplet, the Hive set over or under another.

To Duplicate, the act of performing this.

Fume-Box, the Box kept for the Purpose of Fuming.

Fumigation, } the Operation of stupefying.

Fuming, }

Hackel, or *Coppet*, &c. the Straw Covering set over a Hive to shelter it.

Hive, or *Skip*, &c. That wherein the Bees dwell, and make their Combs, whether made of Straw or other Materials.

Nadir, the Hive which is set under another.

Non-swarmers, a Stock which has not swarmed.

Stock, a Hive of Bees that has stood, or is to stand, the Winter.

Storifying,

Storifying, the ranging Hives over or under each other.

To Storify, to perform this.

Super-hive, to set one Hive above another.

Superior Hive, the uppermost of a storified Set.

Swarm, a great Body of Bees, which quit the Hive together, and fix in some Tree, Bush, &c.

To Treble or Triple, to add a third Hive to a Stock that has two before.

Trebled, a Stock that has three Hives.

Triplet, ditto.

To Triplicate, the Act of triplifying.

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Plate II.

Fig. 1.

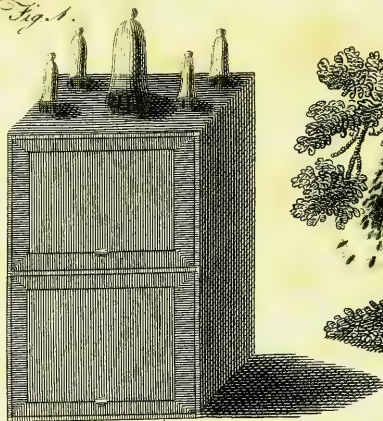


Fig. 2.

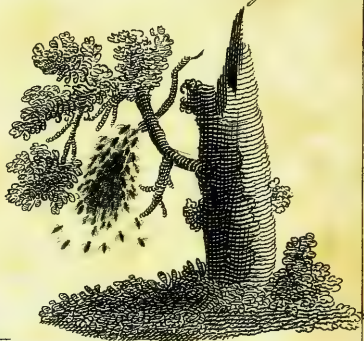


Fig. 3.

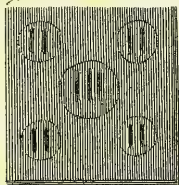


Fig. 4.

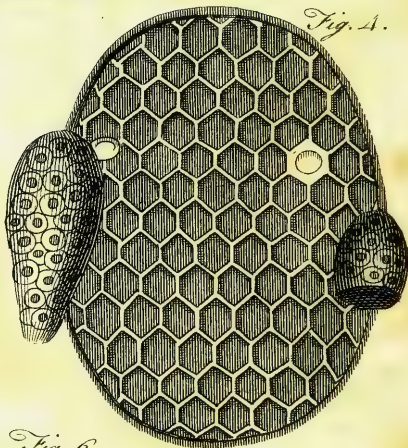


Fig. 5.



Fig. 6.



Fig. 7.





Plate 1

Fig. 1.



Fig. 2.

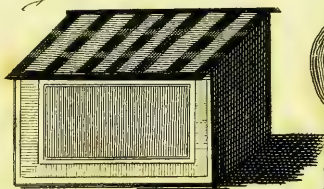


Fig. 3.

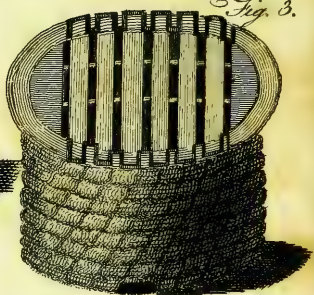


Fig. 4.

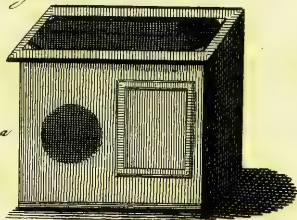


Fig. 6.

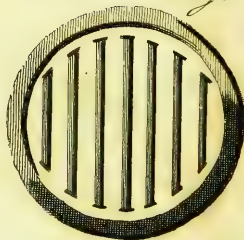
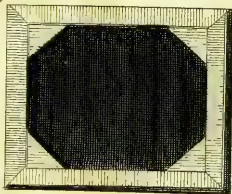


Fig. 5.



THE

Antient Bee-Master's Farewell.

PART I.

CHAP. I.

OF THE QUEEN, DRONES, AND WORKERS.

ON the *single female bee*, styled QUEEN, depend the increase, prosperity, and permanency of a stock. No swarm can possibly be established, unless accompanied by a princess; although the bees become ever so numerous, or eager to swarm. If by any mischance the queen is killed, the bees, soon sensible of her loss, quit the hive to associate with their next neighbours, transferring their treasure with them.

B

The

The QUEEN (pl. I. fig. 6.) being then of such consequence, it is necessary that the apiator should be able to distinguish her at sight. Observe, therefore, that she is longer and more slender than the drones, or the workers; her hinder parts tapering to a point: her belly and legs are also yellower; and the upper part of her body much darker than theirs, nearly approaching to a glossy black. The part beyond the wings is divided into four joints, distinguished into so many rings; whereas the workers have but three, and those of a lighter colour. The more full of eggs, the more yellow is her belly. Her wings reach only to the third ring, but those of the workers extend to the end of their bodies. Her appearance is rather clumsy, but her deportment grave, stately, and calm. She is armed with a sting shorter than those of her subjects. Its use is only to oppose *rival queens*; for otherwise she will bear the roughest handling, without attempting to wound. She is very rarely to be seen, even with boxes of three windows; and, if by chance she is discovered, instantly retires from view.

Her

Her FECUNDITY is amazing; for in the course of a year she usually lays forty thousand eggs, or more: she has been seen to lay forty immediately one after another. Her body at the height of the laying season contains some thousands of eggs. If empty cells are not prepared, she is obliged to drop them. She is five times longer in laying a royal egg than a common one.

The *eggs* are little white bodies, fixed by their smaller end to the bottom of the cell. The royal cells are constructed on the edges or sides of the combs, (pl. II. fig. 4. k.) sometimes to the number of ten or twelve. These cells, when about half finished, resemble the cup of an inverted acorn, *c*, and are lengthened in proportion to the growth of the maggot or nymph. They hang in a perpendicular manner with the open end downwards, *c*. After the egg is deposited it remains in that state three days; and then being hatched, appears as a maggot in the shape of a half moon, lying at the bottom of the cell, surrounded with a clammy white substance, continually supplied by the workers for its nutriment. In five or six

B 2

days

days it grows considerably larger, ceases to take food, is then sealed up, *b*, with a waxen cap, and continues thus about twelve days, when the *royal nymph* bursts open the cover, and issues forth a complete princess. Cold weather makes two or three days difference in the time of exclusion. The queen is impregnated about August, by virtue of which she is enabled to breed in the spring, till she produces fresh drones.

Similar to the process above, is that of the *drones* and *workers*; excepting that the *eggs* are hatched in the common cells, which serve in a double capacity, either for honey or brood. The cells for drones are generally the two middlemost combs of the hive; the cells are deeper than those for the workers, and, when they happen not to be long enough, are lengthened by a cap of wax. They are generally hatched in twenty-one days.

D R O N E S

ARE those large bees (pl. II. fig. 5.) which usually appear before the rising of swarms. They are the **ONLY MALES**, and
are

are larger than the workers ; of a clumsy shape, and their extremity large, as are their eyes ; their trunk, or proboscis, short and thin, and the body more hairy. They make a much louder and rougher noise than the workers ; and having no sting, nor instrument to collect honey, are sustained by that of the hive.

It seems clear to me, that the drones are of NO OTHER use but that of *propagation*. I have, indeed, often found, that stocks will swarm before any drones appeared ; yet, perhaps, some were bred long before, residing in the warmest part of the hive : and which facts proved true ; for drone nymphs have been cast out in early spring. Soon after honey-gathering ceases, they become *devoid* of the spermatie milky liquor, and therefore are discarded. The queen, containing some thousand eggs at a time in her body, demands a larger supply of the *prolific juice* than a few drones are equal to furnish. This accounts for the large number of drones found in the hives, as being absolutely necessary. As soon as the queen finds *no* occasion for their service, they

separate from the workers to the sides of the outward combs.

They are little noticed by the workers, and if killed at the doors of the hives do not resent it. Those that happen to remain in the stocks till the cold weather arrives, soon perish by it.

As their agency in generation, or, indeed, their utility at all, is still disputed, it is worth notice, they are endowed with a large quantity of a whitish liquor in summer, which the workers are fond of licking when a drone is squeezed. The many thousand times I have observed drones in the combs, I never beheld one with its *tail* in a cell.

W O R K E R S.

THE *common bees, or workers*, (pl. II, fig. 7.) live about a year, but are very liable to premature death, by hard labour, high winds, birds, and by many other accidents. They are of neither sex, but absolutely neuters. The young bees are distinguishable from the old, by being of a lighter brown. They are not all of one size, a few being shorter than the others, by being hatched

hatched in shorter cells ; but the dimensions of a cell cannot alter the sexual parts, only as to *size*, and not the male organs into female.

Their labour seems to be *indiscriminate* : they build the combs, nurse and sustain the young, collect honey, and defend the hive against all invaders. For cleanliness they are remarkable ; have a quick and extensive smell, either for honey or honey-dew ; but are not disgusted with many odours offensive to us, as paint, tar, urine, &c. partaking sometimes of such substances as are pernicious to them. Foreseeing impending storms, they make a precipitate retreat in great multitudes.

When *first* placed in a hive they work night and day, taking repose by turns, and sleeping in clusters. They can readily distinguish the bees of their own hive from all others ; and highly resent the killing, or even disturbing, any bees of the same apiary, with vengeance attacking the aggressor.

As probably the following *novel* and curious discoveries may be pleasing to naturalists, their insertion will not offend practitioners.

CHAP. II.

DISCOVERIES.

UNEXPECTEDLY I *saw a queen* on a comb, near the window of a double box; the next day I was favoured with a like *view*; she remained each day about an hour; the bees very respectfully making a free passage for her as she approached. About a dozen of them tenderly licked and brushed her all over, while others attended to feed her.

During this interview I perceived several *eggs drop from her*, which the workers took no notice of. The box in which she then appeared was a *super* one; the under one had only *three* bars, and *four* apertures. The super-box seemed quite full of honey and brood. The queen tarrying and not choosing to descend, being obstructed by the middle bar, probably was the occasion of this reluctance; as also that of the bees from working in the empty nadir box.

From

From several similar disappointments I surmised, that the scantiness of the opening for communication was the sole cause. Instead of *three* bars, from that time my boxes were altered to *six*, which *succeeded* to my utmost wish.

Another time I saw the workers very busy in demolishing a ROYAL CELL, close to the window of a box. It had been sealed up for *several* days: but continuing so beyond the *third* period of exclusion, I suspected some resistance, and therefore was very intent to observe the result. At five o'clock one morning, the workers were very deeply engaged in opening the side of the cell: in about two hours they had made a chasm large enough to see the nymph, and which they were endeavouring to pull out, but in vain. They then proceeded to a further enlargement; when the *queen*, with hasty steps, and anxious looks, as if angry at the delay, began herself the arduous task, the workers remaining quiet spectators. The queen made several violent tugs to disengage it, but her efforts proved fruitless. She then retired,

retired, not without an appearance of displeasure.

The workers then renewed their attempts, about a dozen at a time, and at intervals ceased to enlarge, while they tried to pull the nymph out, but were still disappointed; for on pulling the nymph upwards she was pressed more into the convexity of the top. Four hours were thus employed; when the queen returned, with like demeanour as before, and proceeded with redoubled efforts to extricate the nymph; but still, unfortunately, with no better success, and finally relinquished the toil with great concern. However, the labourers resumed the task of enlargement from top to bottom, which was not effected till near twelve o'clock; a business of seven hours to draw the nymph out. It was full grown, but—*dead!* The season having been bad, the wax which composed the cell was coarse, and much thicker than usual, so as to render it impossible that the young lady should extricate herself in due time.

During the time of the above observation,
I beheld,

I beheld, in some other boxes, royal nymphs bursting open the lower end of their cells, and instantly issuing without assistance.

After many essays by various means, I never could procure a complete view of an intercourse between a *queen* and a *drone*; but have several times been witness to those amorous preludes recorded by *Reaumur*. By confining a queen and a drone under a glass tumbler, after some little time the queen began to caress the drone, frequently repeating such wanton gestures as would stimulate a torpedo, or any other *male* but a *drone*!

Reaumur's relation of this mysterious affair states the result of the royal embrace to be the *death* of the drone. The drones knowing, perhaps, this to be the consequence when *singly* employed, may be the cause of their extreme reluctance. This, together with the violence used during their captivity, and the coldness of their situation compared to the warmth of the hive, seems to account for the non-performance of *that* which naturalists are so desirous of discovering.

I have several times placed two queens,
taken

taken from separate hives, under a tumbler-glass, and immediately a *royal duel* ensued, terminating in the death of both.

CHAP. III.

OF THE BEE'S STING.

THE stinging of bees is often not only painful, but has sometimes proved fatal to man and beast. Having frequently suffered under the *smart*, it has taught me an experimental treatment of the wound.

Bees at a distance from their hives, and while pursuing their labours, are harmless and peaceable; but if disturbed near their habitation, by hammering, bustling, or any other great noise, or by standing before their hives when very busy, these intrusions will urge them to resentment.

On these occasions the *face* is their chief aim, particularly the eyes. In such cases, cover the face with the hands spread, and make a speedy retreat: they will not at that time sting the hands.

During their active season, *gardeners* should do their requisite business near them early in the morning, or in the evening when the bees are retired to rest.

High winds very much disconcert and hinder their labours, and make them very irritable, and prone to assault any person that comes near their dwelling; and more so, if it is at the time of their being anxious to swarm, and if they are by some means delayed therefrom.

To some persons they have a natural aversion, however unoffending, or however they may change their dress, or though at twenty or thirty yards distance.

A single bee will sometimes fly into a room, and settle upon the hands, face, or neck; but they have no hostile intent, and will presently fly off again without wounding; provided no part of the apparel presses upon them. They may gently be struck off, and they will fly out of the window.

The venom of their stings is much stronger in summer than in winter. When a bee gets entangled in the hair, the alarm is great, but danger none, if the patient is
entirely

entirely passive, till another person searches for it, and, when found, crushes it between his finger and thumb.

When bees have been a *little disturbed*, numbers will fly about a person near them, and with angry sound (well known to apicultors) warn them to depart, or they will sting. Retreat in haste, covering the face with the hands, till the head can be protected among bushes, or in some dark apartment; and there remain, till the violence of their fury is abated. It is very wrong, when a person is beset with bees, to strike, or buffet them; for this is of no use, but will make them ten times more furious, and provoke multitudes to assist in the fray. Patience, and a speedy retreat, and sprinkling water over them that remain, are the best expedients to get rid of them, which in about half an hour will be effected: but if any remain on the clothes, they may be brushed off; except those on the face and hands, for that will make them immediately sting. Let them alone, they will quit of themselves, when the rest are departed. If many continue to fly about, let water be thrown among them,
or

or blow them forth with a bellows, which they will suffer without resentment. The smoke of damp straw, or rags, will drive them away soon.

But the highest degree of their rage is provoked by the *moving, shaking, or tumbling down* of their hives; for then the whole army will rise in a mass, and fall upon the aggressor, be it man or beast, hog or dog, to the imminent danger of the creature's life. Immersion in water is the quickest method to get rid of them, if any ponds, &c. are near. But if that cannot be conveniently done; taking refuge in a dark room, or out-house, and using the other means above directed, will be the most likely to succeed, till medical help can be procured.

REMEDIES.

NUMBERLESS have been the remedies proposed, and tried, without being generally beneficial. Those which have proved salutary to some, were the reverse to others; constitutions and the fluids being infinitely various.

Some

Some are affected only in a small degree by a single sting; while others (though few) hardly at all, though by many. Again, many that are delicate and tender suffer severely, though stung but slightly: those also who are of an *irritable* constitution like that of the bees, suffer to a high degree.

In a *curative* point of view, it is of the first importance that a remedy be at hand, so that it may be applied *immediately*, before the subtilty of the venom gets into the circulation. After that happens, the medicine can but have a partial or weak effect. I have generally experienced my own *saliva* (spittle) to be more beneficial than more pompous chemicals or galenicals (I suppose, chiefly, from its being always ready); rubbing it on the wound, transversely from the direction of the veins, and not up and down; for that forces the venom more into the circulation.

A *second* remedy from which great benefit has been found, is, Extract of saturn, half an ounce; volatile alkaline spirit, half an ounce; two drachms linseed oil; shake the extract and the spirit well together, and then
the

the oil: it must be rubbed on the wound well, and constantly, as long as any pain is felt. It is dangerous if taken internally.

The *third* is dulcified spirit of sal ammoniac; adding one third of water, both being well shaken together. This has been found more generally efficacious than the preceding. It will not always prevent some degree of swelling, but soon assuages pain. It is of a harmless quality, and I have often used it about the eyes, without prejudice. To some, dulcified spirit of nitre has proved of present relief. Any of the articles may be had of the chemists, or apothecaries, at a cheap rate.

On great *emergencies*, if, unfortunately, none of these medicines are at hand, common linseed oil should be rubbed on the part stung: or in want of that, neat's foot oil, fresh butter, or hog's lard should be applied without delay, or the cure will be *retarded*, with an increase of danger, if the stings have been numerous.

In the mean time, tea made of balm, elder flowers, or lime tree flowers, or water gruel with a little salt-petre dissolved therein,

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should

should be prepared ; of which the patient should drink plentifully, and often ; refraining from all solid food, particularly that which is salted, or dried ; as also from acrid, acid, or spicy articles. If a fever should intervene, James's powders give admirable relief. But if there is imminent danger, *medical* assistance should be called in. Where the symptoms are favourable, the tumours will gradually subside in a few days, without further applications.

The *like cooling* treatment is also to be used for *horses, cattle, &c.* by enlarging the quantities, by mashes, and by keeping them moderately warm in the stable.

From the foregoing observations, persons may justly conclude, that those to whom the stings of bees are very afflictive, should not, in common prudence, *attempt* the office of an apiator, nor approach bees, destitute of a proper *dress*.

Nor is it advisable to employ *servants* about bees, that have a dislike to the business ; for, otherwise, it is a great chance but they neglect, or injudiciously and perhaps spitefully treat them.

CHAP. IV.

THE BEE DRESS

IS to be made of thin *boulting cloth*, which may be bought at about sixpence a-yard. It is to be sewed to the *brim* of an old hat, when reduced to two inches and a half in width; the cloth is to hang down a foot in breadth all round the head. A broad tape is to be prepared, long enough to tie the cloth, *close* round the neck, under the chin. But as the nose, chin, and neck, would be liable to be *stung* through the meshes, therefore, to secure those parts, some *oiled linen* must be stitched opposite the face and neck, within side, leaving two inches and a half *free*, opposite the eyes.

Or, a kind of hood of the like cloth may be made of such a breadth, that from the bottom of the *crown* of any *hat* in use, it may hang a foot below the rim. It is to be gathered up to a ferret binding, to let the crown through, and encircle it close round.

The portion which hangs down, is to tie round the neck, as before mentioned. Something for the mouth to grasp will be proper in both cases, to keep the mesh at a requisite distance. This last hood is calculated to carry in the pocket.

The *oiled linen* is prepared by soaking linen in linseed oil, and then squeezing the superfluous oil out, and drying it in the air: this process will take two or three weeks. The process is then to be a second time repeated. Gloves made of it, though thin, will be impenetrable to the sting of the bees: indeed they will not attempt it. Garments made of it will effectually resist *wet*. The oil may be previously coloured by the usual pigments, for green, blue, yellow, &c.

Besides the hood, a thick pair of tanned leather *gloves* will be necessary, or other leather oiled only *once*: a portion of old stockings is to be sewed to the extremities to draw tight over the cuffs of the coat. The *legs* must be defended by a thick pair of yarn stockings, drawn over those in common wear. The greatest care must be used in putting on the hood, that no hollows

or chafms be left under the chin, or about the neck ; and for better security, it will be proper to tie a handkerchief over the gathering round the neck, beside that of the tape. An apron before will be useful to prevent these prying insects from tickling the belly.

Thus *apparelled*, *defiance* may be given to millions of bees, or wasps, and *all the operations* may be executed without dread or danger. Or if, by accident, hives are thrown down by cattle, hogs, &c. and the bees enraged ; having this dress on, the creatures may be assisted and the hives replaced.

Women should not meddle with bees, without this bee-dress ; nor then, without the addition of a man's coat, and I had almost said breeches also.

CHAP. V.

ON THE APIARY.

THE properest situation for an *apiary* is one exposed to the wind as little as possible; it being detrimental, and proving often fatal to numbers of bees, by blowing them down, or into the water, or overturning the hives. Trees, high hedges, or fences, on the back and western side of the hives, will be necessary, to screen them from the violence of its force. But they should have a free opening in their front to the *south*, or rather south-east aspect. A valley is preferable to high grounds to favour their increase.

The hives should be well *secured* against hogs, or other creatures, which might displace the stocks, or otherwise disturb the bees, and injure themselves. Let the hives be set as near the dwelling-house as conveniently can be, or to rooms the most occupied, for the readier discovery of rising swarms,

or

or to be apprized of accidents. Besides, the bees habituated to the sight of the family, will become less ferocious, and more tractable; while the buildings will afford a protection from the wind and cold. The hives must be clear of the dripping of trees, nor should long grass, weeds, or dunghills be suffered near them, as harbouring myriads of insects and vermin, that will prey upon the bees and their production. Neither are rivers, ponds, or large tubs of water eligible to be near an apiary, as great numbers will be blown therein.

It is very *wrong* to place *hives* on benches, which is always the source of mistakes, quarrels, and often slaughter, by their interference with one another. A still worse contrivance is that of little *cots*, or sheds, with shelves therein, one above another; affording a greater harbour for their enemies, very inconvenient for the management, and indeed *impracticable* in the story method.

The *arrangement* I would recommend, is, that of *separate stands* for each hive, made by driving four strong stakes into the ground, at equal distances, as thus, :: corresponding

to the dimensions of the hive *floors*, to rest thereon: they are to be sixteen inches above the earth, and the tops to be upon a level with each other.

The stands should be three or four feet distant from one another, and from any wall or fence, in uniform *rows*, for the apiator's conveniency of managing each stock; nor should the hives be set higher than sixteen inches, in the story method; for then their height would be attended with many difficulties. Where persons have many stocks, it is better to divide them into several gardens, as being too numerous in one, frequently occasions quarrels: eight or ten in one place are enough.

Water is necessary near an apiary in a long *season of dry weather*. Put the water in a broad dish, covered with small stones, or duck-weed, to assist the bees in drinking, without wetting their wings, or being drowned.

In *very windy* situations, especially near the *sea*, or great rivers, numerous bees are destroyed, by being blown therein, and others very much injured and hindered, by
being

being drove with violence to the ground, or other hard substances, with the loss of their farina, so laboriously obtained.

Some have thought that an apiary near the *sea coast* would be abundantly productive, by reason of the bees being fond of seawater. This point I have made observation on, my residence being only four miles from the shore, but could not perceive that the bees showed any such partiality, unless necessitated by a long season of very hot and dry weather. Nor did they much affect the wild thyme that grew on the sand-hills adjoining; nor are they fond of salt.

CHAP. VI.

ON PURCHASING OF BEES.

THE best time for establishing an apiary, is just before the taking up season : which is *generally* about the latter end of August, for then bee-keepers reserve as many of the best stocks as they judge expedient for their next summer's supply ; and, therefore, after that period are not disposed to part with any, unless at an advanced price : whereas, by purchasing some time before, a choice may be made of the *best*, and at the accustomed rate.

They should be selected by a *skilful* person, in a cool evening, or rather morning very early. By tapping about the hive, a pretty near guess may be formed, whether or not it is full of bees, as also if full of combs. But for greater certainty, turn those that *seem* heavy upon the edge of the hive, and observe if the *interstices* between
the

the combs are crowded with bees, and the combs worked down to the floor. If white, or of a light yellow, it denotes their being of the present year's produce, and fit for the purpose; but if they are of a very deep yellow, or brown, they are of the last season, and not so proper; while those that are dingy, or *blackish*, are *old*, and wholly unfit to furnish a prosperous apiary. To avoid deception, observe, that though a hive may have the *edges* of the combs of a light yellow, they may be old stocks nevertheless, whose combs the preceding year not having been completed, have in the present had *new* borders added to them of virgin wax, so as to look like young stocks. Look carefully *between* the combs, as far as the bees will admit; and if the interior parts appear favourable, form a judgment accordingly. The hive should be poised in the hand; and if it be about half-bushel size, and weigh twenty-five pounds or upwards, it is another test of its being a good stock. But the weight alone, of old stocks, cannot be relied on, as great part of the combs may be crammed
with

with old farina, and other impurities, as mentioned hereafter.

One good stock bought at the proper time, is worth *two swarms* bought in the *spring*; for such a stock will swarm once or *twice*, or yield *two* or *three* hives full of honey; whereas, from a swarm, little or no profit can be expected the *first* year.

But should the proper season have been neglected, a *prime or first swarm* should be sought, at least large enough, in common situations, to fill a peck, and if a good one, half a bushel. Small swarms will turn to little account, and balk the expectation.

The swarm is to be brought home in the evening of the day it rises. If a large one cannot be had among the neighbours, *two or three* may be united, to form a powerful stock.

If a swarm is delayed being brought home for two or three days, portions of combs will have been constructed, which may probably be displaced in the removal, with the bees thereon, and may be damaged, or crushed, and so be the ruin of
the

swarm: to avoid which, let it be removed at day-break.

To *transfer* the swarm from the common hive, into one of your own, or into a box, invert that which has the swarm in a pail, bucket, or the like; lay two thin flat sticks across, and then set the empty hive over it; stop the juncture with a cloth, and before morning the bees will have ascended into the upper one. But if not, let them stand a day longer; when, if they still are reluctant, stop the juncture quite, and beat round the lower hive with two small sticks, till they ascend, which may be known by the great buz in the upper hive.

Or, as soon as two swarms are brought home, spread a cloth on the ground, and lay a stick across: then strike the edge of the hive with violence on the ground; the bees will fall out in a lump: then take the other swarm, and serve them in the same manner, close by the first; set an empty hive over them, resting one edge on the stick, and cover them with a cloth. If they are found to quarrel when ascended, they must be fumed as directed hereafter.

REMOVING

REMOVING OF STOCKS should be in the evening, or very early in the morning. The hive should be raised by three or four wedges, some hours before, provided the floor is *not moveable*; or *otherwise* many bees will remain on the floor at the time, and be very troublesome.

A cloth must be laid on the ground behind the hive to be removed; nimbly lift the hive thereon, and, gathering the four corners tight, tie them fast on the top: immediately draw a string close round the body of the hive, to prevent any bees crawling between.

If they are to be carried a considerable distance, they may be rested on the ground, as occasion may require. Hand barrows, or yokes, with a hive suspended at each end, or a long pole on men's shoulders, and a hive or two between, may be advantageously used for their conveyance.

But when it is for several miles, a coach, or cart with plenty of straw at the bottom, to break the shocks of the carriage, and then proceeding with the slowest pace, and taking the cool of the morning, will prove

a safe and convenient removal. If any of the combs should, however, be broken, and fallen on the cloth, when the hive is taken off, let them remain thereon, and set the hive in the place or stand designed for it; and gently spreading the cloth with the bees on it on the top, by the morning they will have quitted, and entered by the door of the hive.

A flock should not be set *close* to the beehouse front, the first night of its being brought home, that the straggling bees may find their way into the hive by the door, and then no bees will be crushed. Straw-hives, being of a circular form, leave a considerable vacancy between the hive doors and front, which *next* night must be stopped, by thrusting part of a hay band, or clay, or stiff cow-dung, to fill the chasms, but leaving the door-way free.

Purchased swarms in spring, on bringing home, are to be immediately set on empty hives; and thus, by being doubled at *first*, will save that trouble afterwards.

CHAP. VII.

ON THE FORMATION OF STRAW HIVES.

STRAW is the best *material* for hives, as best protecting the bees in the extremes of cold and heat, and also generally easiest to be procured. Where it is not so, rushes, wicker-work plastered over, or sedges, must be substituted.

Of straw, *unthrashed* RYE is preferable, as thrashing shivers the straw, and makes it rough and shaggy, which the bees with much labour are obliged to gnaw off. My hive-maker laid the straw in a chaff box, and so readily cut off the ears.

The PLAN I propose is, THREE HIVES to each stock. The size I have found most convenient is that of half a bushel: larger are very *inconvenient* to manage; while these, by *storifying*, give ample room for all that the bees can want, at the same time admitting triplets to be taken off the sooner.

They are to be *nine* inches high, and
twelve

twelve wide, in the clear, on the inside, i. e. exclusive of the *top*, (pl. 2, fig. 3.) The *body* is to have no straw top *fixed*, or worked to it, as in common, but is to be a separate piece. The body of the hive, therefore, resembles a broad hoop; and, like that, must be perpendicular, or straight down; and not one part *swelling*, or being wider than another.

The straw COVER is to be made *quite flat*, like a round mat, but wide enough to extend an inch beyond the edge of the hive. There needs only one cover to three hives. The greatest proof of the maker's skill will consist in his exactly following the prescribed dimensions, and in the evenness of his work; particularly in both edges, that they may admit one hive being set on another, without any chafms, and that *promiscuously*, or hab nab.

In one of the edges a distance of full three inches is to be left *free* of binding, for a *door-way*. But a more proper one may be formed by a small piece of wood, four or five inches long, in which a door-way is to be cut, of three inches long, and *three-eighths*

of an inch in height, and worked into the round of straw.

Or, what will be still better, is to take a rod of willow, or hazel, while green, and bend it to a circle of a proper size for the hive. When it is wanted, reduce it so as to have two flat and even sides; cut a proper door-way out, and burn holes at due distances to receive the brier binding, by which the first round of straw is to be fastened to it. If the binding is carried wholly round the hoop, the binding will be soon rotted by the wet, and prove of little more service than if there had been none; but otherwise it will preserve the hive much longer, and be more convenient in many respects.

As soon as hives are made, they should be set separate on *level* boards, or the like, and another on the top, and heavy stones laid on them; but first a person should jump upon the boards to reduce the edges to a proper evenness. This practice must not be neglected.

Besides the flat straw cover, *all* the hives must have WOODEN TOPS, (pl. 1, fig. 6.) to make which, procure a board of the width

of the hive, and half an inch thick, free from knobs. *Seven* spaces or openings are to be cut, b, b, b, b, b, b, b; each exactly half an inch wide; the *length* of the three innermost, *eleven* inches; the two next, *nine*; and the two outermost, *six* inches. The carpenter must be attentive not to deviate from these directions in the smallest degree, as a trifling neglect will render the whole useless.

In case boards of a proper width are not to be had, one ten inches wide may be substituted, braiding circular pieces on the sides after the top is cut out, to fill up the deficiency. Round the edges a hoop of tin, or slight ozier, must be tacked to strengthen it, and prevent its splitting. A long braid or peg should pass through the fore and hind parts, and enter the edge of the hive, to keep the top from being displaced; taking care that the heads of the braids are driven rather *below* the surface of the wood.

A CHEAPER TOP may be made of narrow slips of wood, which I name BARS, *six* in number (pl. 1, fig. 3. a, a, a, a, a, a); designed to be laid across the top of the hive, at half an inch distance from each other; the

two outermost bars to be one inch and a quarter wide, and the others one inch and a half. Two slips of wood, b, b, an inch wide, are to be braided across the bars within side (or rather let in, to be flush on both sides) near the ends, to fasten them together, and to keep them at their due distance. The cross pieces will thus be below the edge of the hive, while the *ends* rest on it. But since the breadth of this *frame of bars* will not be quite that of the hive, the deficiency must be supplied by two small circular pieces braided on the edge of the hive, leaving two half-inch openings between them and the bars. As the ends of the bars, when laid on the hive, will leave vacancies between, these must be stopped by cow-dung of a due temper, which, when dry, will be sufficiently tenacious. Take care that the whole top be even and smooth. It should be laid on always in the direction of *front* and *back*.

The straw covers are to be fastened on by loops of cord, or rather leathern thongs, passed within, at about two inches below the top of the hive. They are to be four in number, placed at equal distances, and a cord

to each pair, to draw them tight over the top.

The HIVE FLOORS should be one inch thick, of yellow deal planed on one side only, truly level, and of sixteen inches diameter. Where boards of that width are not easily to be procured, an additional piece must be *rabbeted* and *doweled* to it. Two cross pieces are to be nailed underneath, to strengthen and prevent its warping; or rather they should be nailed upon the ends. Three of the corners may be cut off, leaving the *fourth* for a place to alight on. ONE floor only is requisite to every *three* hives; but two or three *spare ones* will be convenient on many occasions.

COTTAGERS may contrive *tops* from those cuttings of trees which are straight, of an equal thickness, and of a length as above described. These, while green, may be easily cut flat, with a knife, of the proper measure, by first laying them over the top of the hive, at the distance of half an inch from each other; they may then be marked, and cut to their just length. Two pieces are to be braided under their ends, so as *not* to pre-

vent the cross pieces from sinking into the inside; and to hold the bars steady, without sliding backward or forward. The vacancies between the bars on the edge of the hive are to be filled up with cow-dung, which, when dry, will be sufficiently tenacious. Care should be taken to make every part of the top smooth and level; which if not so, reduce it by laying heavy weights thereon.

Hive-makers in some places have affected considerable difficulty in making hives of the *form* I have prescribed, but without just grounds: the person employed by me, after a little practice, could make them as expeditiously and easy as those of the common sort.

His *method* was to make a common hive, the circumference of whose bottom was exactly to the dimensions I desired; on the edge of this he worked a round and a half of straw, bound on with a *cord*, and then continued to proceed with brier binding, having by him a straight stick, of the due width, as a gauge, and to keep the work truly perpendicular, or upright. If the hoop I before mentioned is provided for the bottom

tom edges of hives, the work might be begun and carried on from *that*.

When he had got about half the intended width, he finished the *round even*. Then loosing the cord from the part he began at, that part was taken off and inverted, and the round left loose by the cord was re-bound by brier: and thus he proceeded till he completed it. It is to be noticed, that the *part* first begun at was in the middle when finished.

Apiators who understand what I have written on this head, should offer a good price to those who are reluctant in making these hives, and should stand by while the workman endeavours to make one; and by giving occasional directions it may be easily effected, and they may be introduced over the kingdom.

It will be a good method to plaster one side of the straw top with cow-dung, even and level, which will prove more eligible in introducing the sliders.

HACKELS or COPPETS are made of wheat-en straw. The method is this: Take a sheaf, bind it with a cord ten or twelve inches

below the ears : with the left hand gripe a small parcel or locket (about 60 straws) of the part above the cord, and with the other hand a like locket ; and giving it a twist round the first locket, bring it down close to the cord, pulling the other locket straight down. Take a third locket and twist over the preceding ; and thus continue to twist and turn down until the whole is finished, except three locks, one of which is to be brought between the other two, which are to be tied in a knot over it. Then reducing the whole as flat as can be, run a short forked stick through the knot, to prevent its starting. The hackel may be made in about twenty minutes.

This form is the best suited to the purpose of any that I have seen ; they fit close to the top of the hives, keeping them warmer and drier, which is of great advantage in winter and spring. Neither are they so liable to be blown off. The part before the doors should be clipped so as to admit the sun's rays. For fear of storms, a hoop may be thrown over them, and fastened by two strong sticks with crooks at their ends, and thrust into the ground

ground on each side. This will be a good security at all times.

Placing the hives at the distance before stated, will preserve the bees from quarrelling, or emigrating from one hive to another.

Opulent persons, to whom the appearance of straw hives may seem inelegant, might have them concealed from view by such shrubs as are of service to the bees, planted at such a distance as not to intercept the sunshine to the front of the hives.

Or, handsome covers, something in the shape of hackels, terminating in a point at top, and painted, would have a pleasing appearance.

Or, a SCREEN in perspective, of rocks or ruins, &c. with proper openings for the bees to issue from behind, on floors properly disposed, on which they should be placed as in a bee-house.

N. B. By *straw covers* are not meant TOPS, which are of wood, with bars. Nor are *hackels* meant by the term *tops*.

CHAP. VIII.

ON BEE BOXES.

BEE boxes are best made of seasoned yellow deal, free from knots, and one inch thick. The boxes are to be *ten* inches high, and *twelve* square; clear in the inside (pl. 1, fig. 2.) One of the sides is to have a pane of *glass*, *d*, of the whole width, and six inches in height, with a shutter half an inch thick, to be let into a bevel at top, and rest on a ledge at bottom, and to fasten with a button, *a*; this is to be esteemed the *back*. There must be a *door-way* in the bottom edge of the front, four inches long, and five-eighths in height, exclusive of the *threshold*, which is to be one-eighth of an inch thick, to be *let* into the edge of the box, and on a level therewith.

A slip of wood is to be fitted for a door, to turn outward to the left, on a pivot or pin, and to shut in a bevel, with a small notch, that it may be opened by the point of
a fork.

a fork. It must shut so far in as to be flush with the side of the box.

The TOP (pl. 1, fig. 2.) is to be composed of *six* slips of wood, which I name BARS, a, a, a, a, a, a, three quarters of an inch thick; the *two* outermost, one inch and a quarter broad; the other *four*, one and a half. The ends of the *second* and *fifth* bars are to be let into the front and back edges of the box, and flush with the outside; the remaining four bars are to be of a due length, to pass easily *withinside* from front to back. Two fillets, each an inch broad, are to be braided to the bars, or rather *let in* transversely, of the diameter of the box, and near their ends, not only to keep the bars at half an inch exact distance from each other, and from the sides of the box, but to connect the whole like a frame together, and to take *in* or *out*, with the combs fixed to them, at pleasure. The bars (1st, 3d, 4th, and 6th) serve also to prevent the frame from slipping from its situation. The top, thus made, will have *six* bars, and *seven* apertures, or openings, like the straw hives.

There is to be but ONE CLOSE COVER, or
lid

lid of wood, three quarters of an inch thick, to three boxes; which is to take off and on by means of four screws, one at each corner.

LOOSE FLOORS are to be provided with the boxes, to be planed on one side, and filleted at the ends to prevent warping, and of an inch more in their dimensions than the tops of the boxes. If a board broad enough cannot be had, a lesser must be added, *rab-beted* and *doweled* thereto. ONE floor *only* is necessary for a suit (three) of boxes, but two or three spare ones will often be wanted.

OBSERVATIONS.

A minute exactness is absolutely necessary in working the boxes; for though the unexperienced may imagine the deviation of a quarter or eighth of an inch from what has been directed will be of no consequence, nevertheless such mistake or negligence in any part would render the apparatus *unfit* for the use it was intended for.

First observe, that the edges of the boxes, both top and bottom, are to be truly level, that when indiscriminately set one *over* or
under

under another, no chasms or vacancies are left between them.

Secondly, that the frame of bars be made to take out with ease.

Thirdly, that the screws for the covers should be slight but long, to pass in at the sides, exactly one inch and a half, from front and back, so that any cover may screw on any box, without making fresh holes. They should always be greased before they are put in, or they will become rusty, and not to be drawn out without great disturbance to the bees, and much inconveniency.

Fourthly, great care must be taken that no snags or splints of wood, heads, or points of nails, rise in the least degree above the surface, as a brass plate is designed to slide over the tops.

A necessary appendage, as well to the hives as boxes, are TWO BRASS PLATES, of one *sixteenth* of an inch thick as near as possible, fifteen inches wide, and fifteen and a half long, which half inch is to be turned upright to pull it out by. They must be set on a true level. If they are *thicker*, the bees will escape on their introduction; and if *thinner*,

thinner, they will not be strong enough to retain their necessary elasticity and level, but will bulge in the middle, and let the bees out.

The braziers or ironmongers will supply them. I gave in London sixteen pence per pound, and they came to eight shillings.

But as in many counties large brass pans or kettles are used, and, when unfit for boiling use, are sold as old brass; the bottoms of such of these as are of the proper dimensions, and not having holes of a size for a bee to pass, will do better than new, as being tougher; and any smith will reduce them to a level, and turn up one edge. They may be bought at the price of old brass, i. e. about six-pence per pound. A *pair* come only to four shillings.

I had an iron plate made which came to near as much as the brass, but did not keep its level so well, and was more unhandy. Steel, being elastic, would retain the level much better, but I suppose would be dearer, and liable to rust; which brass is not, and will at all times fetch a large share of its first cost.

Eight or nine shillings by some may be thought too expensive ; but the great *utility* and *conveniency* of the plates, I am warranted to say, will much over-balance that increase of price. Every apiator must be *feelingly* convinced of the difficulty and embarrassment of separating hives of bees, and in the other operations, by any of the methods made public. Indeed, by them the bees of *under* hives are prevented from assaulting the operator ; yet those of the UPPER ones are left entirely FREE to execute their whole revenge.

By the use of the two plates, or DIVIDERS, and by doors to shut, this great danger and inconvenience is entirely avoided, as the bees of BOTH hives are EQUALLY inclosed, and prevented from insulting the apiator.

Besides, if ONLY one is bought, it is adequate in advantage with any other contrivance, and will suit hives as well as boxes.

Moreover, the plates are not perishable articles, but with care may last for generations ; and it must be remembered that the
charge

charge lies on the whole apiary, and *that* only for *once*.

COTTAGERS, whom I wish to benefit, or others, may club in the purchase, by which the cost will be but slightly felt. Or perhaps country shopkeepers would find it their interest to be furnished with suits of plates to let out.

I have proposed a large window to a box, as I found a small one of little use, and affording but little entertainment. Those who would choose a more enlarged view of the bees in boxes, may have large windows in the *three sides*.

DOORS to the *hives and boxes* will be found of great advantage on many occasions, particularly in passing the dividers under hives, to prevent the egress of the bees if the doorways are stopped, and on various other occasions.

Boxes of bees placed in the window of a room much incommode the company whenever the window is opened. The *side* of the room suits better: a proper opening to be made in the wall, and a small tin trough adapted to pass through to the door-

way

way of the box. On the inside a shelf is to be fixed, that the box may stand so close as to leave no admision for the bees into the room, and be so secured as not to be displaced by any carelessness or inadvertency.

Apiators who have boxes, but whose openings are on a different plan to that now offered, may, at a little expence, have them altered thereto, provided the dimensions of the boxes do not exceed that of the dividers. The superfluous vacancy may, however, be filled up with solid wood, or new tops may be made with the bars and apertures, as I have described, though the box itself be much larger. For should the dividers be enlarged, the hands will not extend sufficiently underneath to keep them close, or steadily to support the great weight: therefore the apertures and bars must not be *longer* than those of my plan, commencing from the *back*. Octagon boxes may have a section of the back taken off, and a large window supply its place.

The timber of the boxes is directed to be

one inch thick, for one quarter of an inch thinner will render them not warm enough.

The *floors* of the hives and boxes being *moveable*, will be of very great utility and advantage in all the operations, and must be so evident to every reflecting apiator, as to need no further recommendation.

CHAP. IX.

OF A BEE HOUSE FOR THREE STOCKS.

IT is to be formed as in pl. 1, fig. 1, and six feet long, exclusive of the posts.

Four posts of three inches square.

Two long rails to nail the floor upon, and two slight ones to nail the roof to.

A floor, seventeen inches in breadth, to be laid across the rails.

A roof, four boards.

Two folding doors.

The posts are to be fixed to the due length, and seventeen inches in breadth to their outside

side. They are to be secured in the ground at a proper depth, and five feet above the earth, and set truly perpendicular. The tops to be bevelled one inch and a half.

The two *strong rails* of an inch thickness are to let into the posts on the outside, and strongly nailed, one in front, the other behind: to these the floor is to be fastened, *cross-wise*, perfectly level.

The *slight rails* are to be let into the tops of the posts close to the ends of the bevel, to nail the roof upon.

On the bevel of the posts are to be fixed *two boards*, each six inches wide, to extend beyond them two inches behind and before.

Two more boards, each at least twelve inches wide, and one thick, of yellow deal, and free from knots, are to be nailed sloping against each other, to complete the roof. Their edges on both sides are to be bevelled off so as to meet at top, and make a neat joint; and to prevent warping, braces across on the *inside* will be necessary.

The FRONT of the house, *A*, is to be inclosed by three quarters of an inch boards,

placed perpendicularly in lengths, from the top to the rail of the floor, and rabbeted to each other. The boxes are to stand six inches from the ends, and eight from each other.

Openings are to be cut against each doorway of the boxes, *six* inches in length, and *two* in depth, *a, a, a*, estimating from the loose floors of the boxes.

Similar openings are to be cut eleven inches higher up, in a line with the first, and even with the tops of the boxes when their covers or lids are *off*.

To the edges of the openings circular pieces of wood are to be braided, a little declining, for the bees to alight upon.

A batten, bevelled at both edges, should be nailed on the outside, just under the highest alighting boards, to strengthen the front boards, and prevent their warping or casting.

The BACK is to have two doors, shutting against each other in a rabbet, and to fasten with a hasp.

The ends are to be closed as the proprietor chooses.

Good painting will be of advantage to preserve the whole. The door-ways should be of different colours, for the bees the better to distinguish their respective habitations.

OBSERVATIONS.

The junction of the boards at the top, however close at first, will gape afterwards by the changes from heat to wet; to remedy which stop it with putty, or rather, as soon as it is nailed on, a slip of thin lead, of two inches broad, should be tacked over the junction, which will effectually prevent wet from getting through. Bohea tea-chest lead, that which is *whole*, will answer the purpose. It is of the most material consequence to bees to exclude wet. I have tried several other materials for roofs, but none answered so well; and mine is a very trying situation.

If the front is not truly perpendicular, and the floor truly level, the boxes will not fit *close* to the front, and thereby leave vacancies

between by which the bees may pass into the house; which would be very detrimental.

The openings for the passage of the bees are *larger* than those of the boxes, as being more convenient on many occasions. No openings are made in the house for *triplets*, as being unnecessary.

Three of the front boards of the house, in which the openings are to be cut, should be eleven or twelve inches wide; or they will be too much weakened, by cutting six inches in length out, to stand true.

The *principal intention* of a bee house and boxes, is for the more commodious inspection of the bees by the curious and wealthy. *Three* stocks answer this design as well as a larger number, as they furnish only a repetition of the same scenes. However, a bee house is, in some respect, of *real use* to those who keep a number of straw-hived stocks, as STANDARDS, from which, by inspection, a judgment may be formed of the good or bad condition of the stocks in straw hives : but, that boxes are *more productive* than those,

is

is a *great mistake*, if both are managed by the same method of STORIFYING.

Many contrivances for the purpose of sheltering boxes have been practised as a substitute for a house; but, in the end, are not cheaper, and not near so convenient for performing the operations; neither are they so eligible for inspection. My bee house here, ten feet long, cost me near thirty shillings.

CHAP. X.

ON STORIFYING.

OF all the methods which have hitherto come to my knowledge for the conducting of bees, that of *storifying* undoubtedly yields much the greatest *profit*, and is the most congenial to their natural habitude, and style of working.

By storifying is meant the setting of one, two, or three hives over each other, as *duplets* or *triplets*.

It is found that *three* pecks of bees in one hive, will collect more honey than a bushel, divided into *two*; because a *single* hive has not combs enough to receive the numerous eggs that a queen is capable of furnishing, and cells sufficient at the same time to hold the honey.

Thus being limited to a small compass, the *increase* must proportionally be so too. For great part of the bees are necessarily employed in *rearing* the young, and therefore

fore the number of those who are occupied in collecting honey is not near so great as has been imagined.

A good *storifier* that has not swarmed, or has had the swarm returned, will increase thirty pounds in seven days, in a favourable situation and season : whereas a single-hived stock in the same apiary and season, that has swarmed, will not increase above five pounds in the same time. For every swarm, the least as well as the greatest, is provided with a queen, equal in fecundity to the queen of the largest stock ; and as the brood she brings continually demands the labour and attendance of probably near *half* the bees ; this circumstance renders the other moiety, from the *smallness* of their *number*, unable to accumulate a *large* quantity of honey in the short time it mostly abounds. Whereas, by doubling, and trebling the hives, the bees are never at a stand for room to extend their combs, as fast as requisite for honey or brood.

Bees, considered individually, *live* about a year, progressively coming into birth, and as gradually decaying. It hence follows,
that

that those born in autumn, or spring, or in the intervening months, inevitably die about the same time in the succeeding periods of time, and so in a regular proportion during the breeding season; but this is not perceived while the brood is rapidly increasing, and counterbalancing the chasms made by death.

The queen often lays two or three hundred eggs in a few hours; which occasions as sudden a disappearance at the stated period, and which accounts for that great *thinness* observable in hives after the swarming season is over, as if a swarm had escaped. This likewise demonstrates, that at the *general* time of *deprivation*, all hives, or stocks, according to their populousness, are composed of bees of all *ages*, from those in embryo, to those of old age. Consequently, although individuals die daily, young ones rise to birth, to succeed them, as do the human race in towns and cities. But, by storing, the family is perpetuated to any length of time, without the *cruel necessity and trouble of destroying indiscriminately both old and young.*

The

The story method can in no case be prejudicial, though the bees should be *prevented thereby from swarming*: on the contrary, it would be a great advantage if it did so; for then artificial swarming would not be wanted to perpetuate stocks, which would be effected without such assistance. Writers have however followed each other, by asserting that by storifying no swarms will rise. From long experience I am certain of the reverse. When duplets or triplets do *not* swarm, it is *not* from *that cause*: it is from abortions of the royal brood, and several other casualties.

Nor is there any danger of being *overstocked*; for however numerous a stock may be in bees during summer, in winter they will be reduced to a *quart*. Besides which, bad seasons often happen, and many accidents arise that will require recruiting, and which may be happily effected by forbearing to double a good stock, and a swarm will be the sooner obtained. The following ESTIMATE will show how far the advantage inclines to *storification*.

A Comparative Estimate of Stocks kept in Single Hives, and those placed according to the Storifying Method.

FIRST YEAR. Dr.	
12 stocks on an average, yielding 15 lbs. of honey each, is 180 lbs. at 6d.	£.4 10 0
Supposing each hive to have a cast, each of which usually affords 3 lbs.—36 lbs. at 6d.	0 18 0
Wax 1 lb. each, and 4 oz. the cast, at 18d.	1 2 6
	<hr/>
	£.6 10 6
N. B. They are supposed to emit 12 good swarms, to stand for stocks.	
To balance in favour of the story method	2 1 6
	<hr/>
	£.8 12 0
Thus at the end of the year the stocks will be equal.	

SECOND YEAR.	
12 stocks being the last year's swarms	£.4 10 0
Casts, or small swarms	0 18 0
Wax,	1 2 6
	<hr/>
	£.6 10 6
Balance in favour of storifying	4 17 6
	<hr/>
	£.11 8 0

FIRST YEAR. Cr.	
12 stocks on an average will yield two additional hives of honey, of 16 lbs. each—384 lbs. at 6d.	£.9 12 0
Wax, 1½ each hive,	1 16 0
	<hr/>
	£.11 8 0
Discount for the extraordinary expences, viz.	
24 hives at 14d.	1 8 0
12 floors,	0 6 0
24 wooden tops,	0 12 0
2 brais plates,	0 10 0
	<hr/>
	£.2 16 0
	<hr/>
	£.8 12 0

SECOND YEAR.	
12 stocks produce as last year	£.9 12 0
Wax	1 16 0
	<hr/>
	£.11 8 0

From hence it appears, that by laying out *two pounds sixteen shillings* for the extraordinary *apparatus* of the *first* year, a superior profit is to be gained of *two pounds one shilling and sixpence*. But in the *succeeding* years it will amount to *four pounds seventeen shillings*, that is about fifty per cent. per annum, on the two pounds sixteen shillings so laid out: or four pounds seventeen shillings and sixpence a-year more, gained by storifying *twelve* stocks, than by a like number in *single* hives.

This statement is made upon the *lowest* calculation in favour of storifying, which usually yields much more honey and wax than here assigned, and that greatly superior in quality, and consequently more valuable; but which *cannot* be obtained from *common single hives*. The instruments are rated higher than what they will usually cost, besides their advantage of durability.

Though I supposed each common-hived stock to emit a good *first* swarm, which they often do not, or it is frequently lost, and though some often afford two or three, they in general are but trifling, and abate considerably

siderably of the produce of the mother stock, often to its ruin—what I have allowed for casts, in the common run, will be the full amount.

The estimate is founded on the productions of *middling* situations; but in *better*, a single hive may produce a stock of from thirty to forty-six pounds weight, gross; the *higher* likewise will be the proportional advantage in storifying. *Where* hives weigh so, they are usually much larger than the general size: and I think in the *single* method, no hive should be less than three pecks, or perhaps a bushel, but not more than twelve inches in height. The twelve stocks will require three shillings and sixpence to be laid out in new hives, every *third* year, which I set against twelve new hives at least, which must be bought for swarms in the single management. *No other branch of husbandry* (I am inclined to think) *will return so large an interest on so small an expenditure.*

Besides the advantages already mentioned, there are others of consequence which deserve notice. 1st. In avoiding the unneces-

fary and disagreeable trouble of SUFFOCATING the bees. 2d. In relieving swarms when too large. 3d. In preventing idleness in their lying out. 4th. In uniting of swarms. 5th. In the means of cleanliness and wholesomeness. 6th. In preserving them from moths, mice, and other insects, by the frequent shifting of the hives. 7th. In giving ample and timely enlargement. 8th. In being provided against bad seasons. Lastly, In taking but little room in an apiary: as for instance, four stocks will require no more ground to stand on than they had at first; while common hives will demand twice or thrice as much for swarms, but producing less honey.

The INDICATIONS FOR STORIFYING stocks, are the appearance of an increase of numbers, and in their activity, favoured by the mildness of the season. If the stock be a last year's swarm, set a duplet *over* it; and as soon as that seems, by its weight, to be three parts full, set a triplet *over* the duplet; which *last*, when full, or nearly so, is to be taken off, and probably will be all intire virgin honey, and without brood.

Then

Then raise the duplet, or double hive, by placing a triplet *under* it. But if the strength of the stock is great, and there is plenty of honey pasturage, so that another triplet may be expected to be filled, place the triplet over, instead of that which was taken off. Perhaps, in some good seasons and situations, *three or four triplets* may be taken, if they are opportunely applied.

But if the stock is of *two* years standing, it must be raised on a nadir; and as often as it requires enlargement take the superior hive off, and put a triplet in its place; and proceed thus as occasion may require.— These *two* methods of superhiving the *last* year's swarm *one* year, and the *next* of nadir-hiving the same stock, will be a sure means of obtaining the greatest quantity of *virgin honey*, and the largest quantity of the *best wax*.

Observe, in all cases, when hives are set over another, that if the nadir is judged to be about three parts full, the door of it must be stopped, and that of the duplet opened, or the bees will not so soon be tempted to ascend, to work in the duplet, nor will this
procedure

procedure increase the labour of the bees in the meanwhile, as the way down is as short as the way up.

On the contrary, when a hive is placed under, the *door* of it must be stopped for a week or two, or till there is reason to think there are some combs made in it ; and then it is to be opened, and in two or three days after *shut* again, disguising it with a cloth, &c. hung before it, for two or three days.

Be particularly careful *not* to let the stocks be *crowded*, before they are storified. For if a princess is impregnated *early*, it may occasion a swarm to rise suddenly : for often great numbers of brood are hatched together, and therefore from want of room become ferocious, and occasion much inconveniency to the apiator and bees ; but presently become peaceful and satisfied on enlargement. For an additional hive having communications in direct lines with the combs of the hives added, the bees are led to esteem the whole as one hive, in a few days after its application.

In some *critical* days or weeks, when *honey dews* are plentiful, or white clover or

other pasturage is abundant, the quantity of honey collected in a few days will be almost incredible, if they have room enough to lodge it, filling a hive in *seven* days: often more than can be accumulated in a whole season.

But the advantages arising from additional hives are entirely lost in the old *single* method.

The duplets are in general not to be taken off till late, lest the queen should be therein, or it be mostly filled with brood. But super-triplets may be always taken as soon as filled.

Bees never begin to work in an additional hive, until new combs are wanted for eggs, or honey; and then the bees will begin to hang down, in *ranges*, or curtains, which is always a sign they have begun to make combs.

Bees often want enlargement before swarm time; which is denoted by their idly playing about the door and hive. It is the owner's fault and loss if he suffers it to continue.

Duplicated boxes will sometimes appear *full*
of

of combs and bees, through the back windows, though perhaps they are not above a quarter or half filled, the combs being only at the back.

If the bees of a triplet lie out, before the usual time of deprivation, it should be taken and placed at a considerable distance, and the duplified stock raised on a nadir hive: if, in two or three hours after, the bees of the stock seem quiet, and work as before, as well as those removed, it is a sign they have a queen in each; and the hive taken may be reserved as a stock, if such is wanted, or *fumed*, and the queen taken away: most likely there will be much brood, which may be set over a weak stock, or returned again to its mother stock.

In case duplets have idlers, they are to be *raised* on a triplet, and in about a month the superior hive is to be taken off. For when lying out in hot weather, though their hives are not full, and the swarming season is past, the bees will not *enter* notwithstanding; but by adding a *nadir* hive, the accommodation of a spacious and cool hall to regale

F 2 themselves

themselves will induce the idlers to enter it.

If it is suspected that bees are idle (which, though they do not cluster out, may be discovered by their not being so active as their neighbours), turn the hive up in the middle of the day : and if the combs are partly empty, it may be concluded they have either lost their queen, or she is unprolific, or is without drones; in which case they are to be slightly fumed in the evening, and set over another stock ; particularly a weak one to strengthen them.

But if the stock is abundant in bees, and most likely in honey, let them stand till a young queen can be taken from a swarm ; when placing her just within the door, she will be joyfully received. Otherwise, if it is about the middle of the season, fume, and place them *over* a stock ; and by that means it will produce a very large quantity of honey.

Scanty breeders produce but little honey or brood ; so that, whilst other stocks are rapidly increasing in riches, these will barely get
enough

enough to support themselves in the winter.

Empty combs placed in a duplet will not entice them the sooner to work therein ; for till the hive is completely full, and they are in want of others, they will not ascend, which in bad seasons may not happen for a considerable time : nevertheless, from being ready, they may be of considerable advantage.

About the tenth of July the *upper doors* of all storied stocks should be closed, to induce the queen with more certainty to descend, and breed in the *lower* hive, except it is *designed to be taken* ; for then the door is to be shut, and the upper one opened.

It often happens that in *poor situations*, or in a long season of very *inclement weather*, neither duplets nor triplets will have work therein ; and this is *not imputable to a bad method* of management, or want of conduct, but *wholly* to a failure of the resources of pasturage, or of opportunities to gather it ; which sometimes has been so great as to prevent the generality of stocks from procuring a sufficiency for their own winter's

supply. It is necessary in summer, when a hive has few bees, to strengthen it with a portion of bees from one that is strong. This will enable the queen to breed fast, and the hive will prove as prosperous as any hive you have. But in all such reinforcements, the hive so replenished should be set at as great a distance as your convenience will allow, for several weeks. This is a rule to be observed in all such cases.

Stocks that have *emitted* swarms can but rarely be expected to yield a duplet that summer, *unless* the swarm is *returned*. Much less can a swarm do it, though I have known some exceptions in extraordinary situations.

To *replenish* a stock that is *scanty* of bees, set some empty combs, and pour the cells of one side full of sugared ale, or platters of it, slightly covering it with a little hay or herbs, to prevent the bees from damaging themselves in it: set it on a hive floor in the morning, and place an empty hive over it, in the midst of the apiary.

A great multitude of bees will be attracted by the odour, and assemble round the feast.

As

As soon as that is perceived, stop the door of the hive until night; when the bees having ascended to the top of the hive, take it, and give them a slight fuming, and place them over or under the stock that most wants their assistance.

If a queen is killed or dies in the summer, it may be known by the bees not carrying in any farina, or by the door of the queenless stock being much crowded, as well as that to which they carry the honey. Both hives appear prodigiously active, as though a honey dew had commenced, and with a clear uninterrupted buzz, with crumbs of wax about the door. Immediately stop the door of the unfortunate stock, and unstop it in the evening: the interlopers will then fly home. Early in the morning, take the hive to a proper distance, and fume it, or keep them confined till next day, in a darkened room. They will then very peaceably and readily quit the hive on a little drumming on the sides. If the hive has much honey, cut the combs out; but take care of those that have brood, and add them to some other stock. The bees, however, will continue working till all the young are sealed up.

If a like accident happen in winter, take the bees out, put them to a stock, and take the honey.

In the want of a hive upon a sudden demand of enlargement, and not having a proper one in readiness, set a common one with bars across it, in a pail or bucket, and place the stock over it; next night close the joining, and at the accustomed time separate it by the dividers, and take the bottom one away.

SUMMERS have sometimes been so HOT as to soften the combs so much as to tumble them down, occasion the smothering of the bees, and ruin of the stock. To prevent this, in such weather, give them enlargement, and raise single hives behind: screen them as much as possible from the sun, by large boughs, pouring often plenty of water about their hives, and taking off the hackels. Bee houses should have all their doors set open.

CHAP. XI.

THE NATURE OF SWARMS.

DURING the *winter*, flocks that are populous in the summer become reduced by age and accidents to the small quantity of a *quart*, and the weaker flocks sustain a proportional diminution. The *repeopling* the hives, therefore, depends on the amazing FECUNDITY OF THE QUEEN, which furnishes those new-born multitudes that constitute the swarms.

In consequence of a continued great increase, the bees feel a natural impulse to swarm. This law they are impatient to obey, in defiance of all the obstacles that the ingenuity of man has contrived to its taking place. A swarm does not consist of all *young bees*, but of *old and young* promiscuously.

The *breeding* of young bees is begun sooner or later, in proportion to the *fruitfulness*

ness of the queen, the populousness of the stock, the goodness of the situation, and of the weather. The more numerous the bees are in the hive, the greater will be the heat to enable the queen to begin breeding *earlier* than those of other stocks. When bees are carefully supplied with food in spring, they breed fast even in bad weather.

When *January* proves mild, the breeding will sometimes commence at the latter end of that month: but *often* in February, and in March *generally*. As soon as bees carry in farina, or yellow balls, on their legs, it is a sure sign of the queen's having begun to breed. A long season of cold and wet weather retards the hatching or increasing of the breed, causing many abortions, and not uncommonly that of the royal nymphs. They may be seen cast out in such unkindly seasons.

The influence of a genial spring hastens the breeding, and no less accelerates the blossoms proper for their nourishment; the fallows, willows, snow-drops, crocuses, &c. yielding plenty of farina.

But should the weather be unfavourable
while

while these flowers are in bloom, thereby preventing the bees from issuing out to collect it, those already hatched will be starved; and it will also delay a farther increase, until a more auspicious change takes place.

If a spring is not *very* cold, but wet, it will not favour the production of royal brood; yet the *common cells* will be filled with *young*, but no addition of honey; which will cause the bees to be very anxious to swarm, and very irritable, flying about the hive in confusion and discontent. I have several times seen *royal cells* in which the workers were continually introducing their heads, I suppose, to feed the maggot; but, after a few days, they entirely neglected them, probably as being abortive. In such cases no swarm can rise until another birth yields a princess.

In spring, when bees that are in no want of food suddenly give over carrying, it may denote the unprolificness of the queen; and if the hive contain but few bees, they had better be united to another stock.

In *forward springs*, when the workers are few, but the queen very pregnant, she will be obliged to deposit her eggs faster
 4 than

than the small number of bees can supply the maggots with sustenance ; and they will therefore perish, and be cast out. This is a disadvantage which arises from keeping *weak* stocks.

To judge of the fulness of a hive in May, observe the numbers of bees that enter the respective hives, and form an estimate.

Queens are not EQUALLY FRUITFUL. While some breed slowly or not at all, others will speedily increase in prodigious numbers. Sterile queens should be exchanged for the spare queen of a swarm ; or at taking up time destroyed, and a new stock substituted.

From the middle of *May* to the middle of *June* is the most *advantageous* time for swarming ; but they often rise, not only at the beginning of *April*, or sooner, but also as late as the 20th of *August* ; counties and seasons being so very various. *Very early* ones are seldom large enough to constitute a good stock ; and are in danger of perishing if bad weather succeeds. *Very late* ones, though mostly large, will often not have sufficient time to lay up an adequate

quate store for the winter, nor rear a brood in time: beside which, their emigration diminishes the *parent stock* so much as to endanger its being starved during the next spring. The prevention is, to encourage *timely* swarms by *warmth*, and by a trough of sugared ale now and then, in February and March. But whether the swarms are early or late, is a matter of no consequence in the story method, by which they are *returned* to the stocks.

In a *good season* for early honey-gathering, the stocks will not be forward to swarm, though they have a princess ready; being *then* wholly intent to collect the precious sweets, and almost deserting the hive: the few left, finding such spacious room, and full employment, have no temptation to rise, and quit such treasure for an empty hive.

Though a spring should be *cold*, and *otherwise* unfavourable, a swarm may *rise* the first or second fine sunny day, if a princess is impregnated, notwithstanding the hive may be very *thin* of bees. The swarm, of course, will be small. New swarms will gradually desert their hive on a continuance of bad weather,

weather, and unite with another stock or stocks, without loss to their master.

The *increase* of swarms in calm situations is frequently three from a hive; and swarms will emit swarms, or maiden ones. But it is to be observed, that in these cases the *production of honey* is proportionally *less*, not near so much as might be expected from the multitude of bees, for the reasons before assigned.

Frequently, when stocks *in very good situations* have many princesses, swarms will rise though the weather has been unfavourable; while stocks only two miles distant may be starving, and afford no swarm.

Stocks single-hived, on being filled, and having a suitable princess, will often swarm repeatedly, though of small bulk; by reason that, having no more space to work in, they would rather swarm than be idle, that the precious advantage of honey-gathering may not be lost.

In very DRY SEASONS few swarms are discharged. On examining the hives, no princess or royal cell was found. The cause is uncertain; perhaps the drought did not
favour

favour that kind of prolific nutriment fit to produce royal eggs or brood, and therefore no swarms could be formed. Such stocks should be taken at the season; for having, it is most likely, none but old queens, they will die in the winter, and put an end to the stock.

Bees that are placed near WOODS find therein abundant farina (the great source of early swarms) to feed their young. In all situations that have plenty of farina, the bees are remarkably forward and active. In the HEATH countries, on the contrary, they are later in their productions than in other situations, seldom swarming till the end of July, owing to heath blowing late. In general, the bleaker the situation the later the swarms.

A WET EARLY season prevents the gathering of farina: then late swarms will be the consequence; and if the weather should continue very indifferent, they will rise when least expected, and be lost for want of watching.

After the *first* or *prime* swarms have risen, the succeeding ones should be *returned* to the stock; for if a second is emitted, it certainly so much impoverishes the stock that little
honey

honey can be collected afterwards, and will not leave a sufficiency of bees to rear the young, which at that time are abundant. Undoubtedly there are exceptions, which a discreet apiator must be left to judge of. When *additional stocks* are *not* wanted, the *prime swarms* are to be *returned*, as well as casts; as being the most *profitable* method. The stocks on the storied plan cannot be kept too full of bees in the summer time.

Stocks that have not swarmed before the first of *July* from single hives, should be returned; but reference in these and the like cases must always be had to the *difference* of seasons and situations, in which local circumstances only can direct the determination.

A large EARLY SWARM, with good weather succeeding, will be far more productive than a similar one that rises later; for having more time before them, their hives will be furnished with combs and brood before the honey harvest commences, and then are prepared with empty cells and young workers, that will, in a short time, enable them to collect a large store of honey, if care has been previously taken to provide them with spacious

spacious room. If bad weather should intervene, it will be prudent to feed them, for which their subsequent labour will amply recompense.

There have been *instances of stocks* which have swarmed, and notwithstanding in the middle of *July clustered out*; and on having another hive set *over* them, still remained, without ascending; but two or three days after, on setting a hive *under*, they presently entered, and worked vigorously.

With respect to those stocks which do not seem to INCREASE in numbers, or appear to have DRONES; a dozen or two should be taken from another stock that has plenty, and put to them. To effect this, in a fine sunny afternoon, when the drones issue out most, take them singly with the finger and thumb as they pass on the resting board, and put them into a long phial, held ready in the other hand, till the number wanted is obtained: stop the phial with a notched cork, and at night fasten the mouth of the phial to the door-way of the hive, and by morning they will have entered.

Those persons who KILL THE DRONES

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in the *spring*, are not aware that thereby they are destroying the only means of increase; for the drones are to bees what males are to other creatures. But if it should be observed that the drones in *summer* are so abundant, especially of a weak stock, as nearly to consume the honey as fast as gathered; in this case, and this only, some of them may be destroyed.

Many *schemes* have been tried for diminishing the drones, but with little success. For if they are stopped from entering their own hive, they know their next neighbours will gladly receive them: nor will TRAPS sufficiently destroy them; and their application greatly disturbs and hinders the workers of not only their own hive, but also of others.

More may be killed on the alighting board in a short time by the end of a case knife, than by any other means; and if done leisurely, the workers will not resent it for a while. When they do, retreat, and try again some little time after. If continued long, the workers will be so disturbed as to *enter* other hives, and the whole apiary be alarmed. If
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the workers do not kill the drones at the usual time, a few may be killed by the fingers; and then thrusting a small twig into the hive will provoke the workers to finish the business. August is the usual time of massacre. The strongest stocks expel them the soonest: however, if they are not killed *then*, the cold weather effectually destroys them.

Great numbers of workers are bred before princesses or drones, which last do not usually appear before May, unless in early springs; and the populous stocks will have them in March, and often in April.

Hives, however, will often be so full of bees as to cluster out, and frequently swarm, without any appearance of *drones*; though it is probable there *may be a few*, but the weather too unfavourable for their shewing themselves, as they are more tender than the workers.

LYING or CLUSTERING.

THE lying or clustering out of bees, on or about a hive, has been commonly looked

upon as a *sign* of their being ready to swarm: but this is deceitful. It indeed may denote that there are bees enough to compose a swarm; but it is also a token that there is *no princess* to go with them; for, in want of room, they often continue clustered several weeks.

It must be considered, that when the combs of a hive are *full of honey and brood*, the spaces left between, being only half an inch in width each, contain only a *third* part of the capacity of the whole hive—about fourteen thousand to a half bushel—and consequently become *soon overcharged* by a forward queen, and the surplus is obliged to *lie out*; which, in fact, they always do, in such circumstances, and perhaps till the middle of August in hot and dry seasons, when but few bees can remain in the hive.

This clustering is very prejudicial, not only in the loss of time, but also in *what* the bees might have acquired by their labour in that interval, usually the most productive of any part of the season, when every bee ought to be fully employed. Nor is this all: the bees by this *indulgence* contract a habit

habit of indolence not easily relinquished. The example tempts others to be as idle as themselves, greatly obstructing those that work, in their progress. Some, indeed, will be industrious in spite of their owner's inattention, and proceed to build combs on the outside, or under the floor of the hive.

Although it is a certain sign, when bees lie out from day to day, that there is no princess ready; yet as there is no practical means of knowing *when there will*, a constant watching is necessary.

These disadvantages are *admirably remedied by storifying*.

But COTTAGERS, who have not this convenience, may cut a door-way in the back of an empty hive that already has one in front. Set the empty hive with one of its door-ways against that of the stock, fixing on a proper support, so as to be on an exact level with the stock. The *vacancy* left between the two hives fill up with a piece of hay-band, &c. taking care, however, to leave the passage of the two door-ways *free*. The bees will then pass through the empty hive

to the full one, till more room is wanted, and *then* they will begin in the additional one.

TO SEPARATE them when full, at night gently take away the hay-band; have a lump of clay or cow-dung of a proper consistence ready; nimbly force that between the two hives so effectually that it may stop both doors; take away the foremost, and place another empty one in its stead the *next* night. About an hour after taking up the first, you may venture to open the door of the stock with the end of a long stick, and in the morning entirely clear the dung away.

Under this management the bees will constantly be employed, nor can they possibly be prejudicial to the owners, though thereby the stocks should not swarm, for *doubling* does not *prevent* it.

The PROFIT on bees depends, in a great measure, on the *detention* of the swarms. If THEY ARE LOST, the increase of honey can be but *trifling*, however carefully all other particulars are observed. A *casual inspection* will not answer this important purpose. I have not seen or heard of any apiators (myself

self *not* excepted) who through neglect in this point have not lost, more or less, swarms every year, and chiefly *prime ones*; for bees often swarm without a minute's notice, perhaps the very instant after being left. There is no sure way of securing swarms but by a **CONSTANT WATCHING** of a *bee-herd*, retained on purpose, from seven or eight in the morning until three or four in the afternoon, till all the prime swarms have issued. Bad weather may be excepted.

Children, or rather aged people, might be employed to do it at an easy rate; and if it should cost seven or eight shillings, it is better to be at that charge, than run the great risque of losing several of the *best swarms*. You also escape the anxiety and trouble of going constantly to and fro, which is after all attended with uncertainty. Besides, if a person keeps but six stocks, and saves only one swarm, he will be no loser; to which add, the assistance given to an indigent family by the money expended. The usual hours of swarming are from ten to two; but this is not to be depended on. I

have often known, and had them *rise* as early or late as the hours stated.

Another cause of the loss of *prime* swarms, is the *mistaken notion* that bees always shew certain *signs* or *tokens* of their going to swarm; and therefore until those signs appear, watching is omitted. But it must be evident to every reflecting apiator, that swarms frequently rise early in the spring, as well as at other times, without shewing any such signs at all. On the contrary, in some seasons the hive may be so very full of bees as largely to cluster out, and make an astonishing noise within, as though that moment they would rise, and yet very often do *not*; *no*, not for *several* days or weeks afterwards, and sometimes not at *all*. These tokens, indeed, clearly shew there are bees sufficient in number for a swarm, and they are most anxious to do so; but it also shews they cannot break nature's law: NO QUEEN NO SWARM.

Although there are no signs that precede *first* swarms; of *second*, or *casts*, or after ones there are, viz. peculiar SOUNDS or NOTES
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in the hive not heard at any other season. They may be heard generally in the evening in fine weather, and sometimes for several days together; being probably expressive of the princesses' being ready, and desirous of enjoying empires of their own; for several are afterwards heard at a time, in a kind of response either more acute or grave, but very different from any sounds made by their wings, and seeming to be formed by a tube, resembling the expressions of *toot, toot, toot*, or nearly that of a child's penny trumpet, but not near so loud. Many chimerical conjectures have been formed relative to this particularity; but one *certain meaning* they convey to the apiator, that when heard he may be assured that the *first*, or *prime swarm*, has escaped, if that will comfort him.

It indicates also, that a swarm may be expected very soon, perhaps the next day, or in a few following ones, according to the fineness of the weather.

When the number of *princesses* is too many to be supplied with bees for swarms, it induces

duces three or more to issue with a single swarm, and either settle together, or divide into different clusters; well knowing that death will be the fate of those that tarry behind. Sometimes, indeed, a princess will coax a *few* bees to accompany her, and form a small cast, of no profit, but which rather contributes to impoverish the stock.

SECOND SWARMS are seldom worth preserving *single*; but by uniting two or three, you may form a good stock.

If a swarm is wanted from a *duplet*, both doors must be left open; but if none should rise, the stock at separation most likely will have a queen in each.

It is very probable that a princess may sometimes rise unimpregnated, or not ripe for *laying*, and which the bees at their exit with her were not sensible of; but when hived, finding their mistake, they abandon her and the hive, and return home again.

On the *rising* of swarms, many bees just returned from the fields with their loads, and many just entering, join them; by which means they are capable of construct-
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ing combs presently after settling ; and sometimes do on the branch of a tree, if they are suffered to remain there a considerable time.

When bees *play idly* about the door or hive, and are more than ordinarily mischievous, it is a sign they are anxious to swarm ; and probably may rise, though *without a princess*, if it is late in the season, but will return home again.

If the wind be brisk at the time of a swarm's rising, it will fly in the same direction, and will settle in that spot which will best shelter them from the inconveniency, regardless of their *accustomed* place of clustering.

As none but good swarms at any time ought to be kept, it will be necessary to ascertain how such may be known. It should be in bulk, when hived, not less than a *peck and a half* ; in middling situations they run more. I have had them in Hertfordshire frequently half a bushel, sometimes larger.

Near Pembroke they seldom exceed a peck, which is here esteemed a good swarm.

How-

However, not *less* than a peck will prove a productive one.

A swarm will appear much larger as it hangs on a bush, than when clustered in the top of a hive.

The number, weight, and measure of bees.

	lb.	oz.	dr.	
100 drones	0	1	0	} AVOIRD. WEIGHT.
290 workers	0	1	0	
4,640 ———	1	0	0	
915 ———	0	3	2	} WINCHESTER MEASURE.
1,830 ——— a pint . . .	0	6	5	
3,660 ——— a quart . . .	0	12	10	
29,280 ——— a peck . . .	6	5	6	

This statement is made on an average; for they will not prove twice exactly alike, because of their different degrees of fullness, &c.

CHAP. XII.

THE HIVING OF SWARMS.

AS swarms (pl. 2, fig. 2.) frequently rise when not expected, and that with precipitation, common prudence, it might be thought, would induce apiators to have hives in readiness. But I have often seen the contrary, though the expence of the hives would be less, when bought early, and you would also avoid the risk of losing a swarm while seeking a hive.

The poverty of cottagers may be an excuse for such supineness. Therefore in such an exigency the swarm may be put in a pail, bucket, basket, &c. in which let it remain till the evening; when turning the vessel up, lay two flat sticks across it, place on it an empty hive, bind a cloth round the juncture (all but the door-way), and by the morning the bees will have ascended therein; but if not, gently beating the sides of the vessel will cause them to ascend.

To

TO PREPARE hives for the reception of swarms, the snags, or the roughness of the straw, should be clipped off, and rubbed as smooth as can well be, as this will save the bees a deal of labour, which they will employ to greater advantage in constructing of combs.

Boxes should have all holes and crevices stopped with putty, or other cement, which otherwise the bees must do, to exclude air and vermin.

SPLEETS, or sticks, are proper to support the combs, when extended near the bottom; but TWO ONLY are necessary, and placed thus +, at the height of the second round of straw from the bottom; one from the front to the back, the other across *that*, from right to left: for as the combs are *usually* built in parallel lines from front to back, each comb, when wrought down, being of considerable weight, it will have a ready support from the spleet, and which will serve to fasten them also; but till they become weighty, *no* fastening but that which the bees themselves execute, will at all be needful.

But

But as *sometimes* the combs are constructed obliquely, or transversely, a second spleet is necessary to take them in that direction. In fact, *common hives*, having no occasion for removes till they are taken up, *need no spleets*, as verified by bees in hollow trees, &c. However, the two mentioned are enough for any hive, even in the story method: much less have they occasion for *any* spleet near the top, and which is generally so preposterously placed as to be very troublesome and prejudicial to the honey, in taking the *combs out*.

No other *preparation* or *dress*ing of hives is necessary, than that which I have mentioned. The employing herbs, and many other fanciful articles, *is of no use*; but as people are wedded to old customs without rational foundation, sugared or honeyed ale, sprinkled in the top of the hive, is the most alluring substance that I know of. The truth is, when a swarm quits a clean hive, it is for *other* causes, and not through distaste of the hive, unless it is too small.

It is customary to make a TINKLING NOISE to ALLURE swarms to settle. Why
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it does so is *uncertain*, but that it does is as certain. Most prime swarms, that are not in a habit of settling in an usual spot, are mostly lost, if not *tinkled*.

Besides which, it ascertains the right that the apiator who follows it, has to claim it, if strayed from his own premises. The greater the noise, the sooner it is likely to succeed. I find a WATCH RATTLE (used about London) the most efficacious, and that when the common method has failed.

In *prime* or first swarms, the noise should not begin till such a quantity of bees have arisen as will form a good swarm, for fear of terrifying the princess from issuing; and if so, all the bees will return, though hived. A sudden storm, dark clouds, or thunder, will cause them to return, if not settled; or if the princess, too weak to sustain the flight, drops on the ground; or if the bees are *roughly* treated in the hiving.

The noise should be made on the contrary side to that which will be most proper for settling. Nor should it continue longer than the bees *begin* to cluster: there is no danger but the rest will follow on hearing their
buz.

buz. When they rise in windy weather they are very irritable, and apt to sting; and though clustered, often return home.

When a prime swarm is broke or divided, the *second* will be much superior; and therefore, if it is in good time, may be kept, if a stock is wanted.

When bees are hived, but seem discontented and tumultuous, it is a sign they have no queen among them. Probably she will be found on the ground, with a small cluster surrounding her. Take the cluster up, and place it on the outside of the hive which has the swarm, or near the door; it will soon make them easy, and allure those on the wing to join them also.

Hives fixed near the spots where bees have been used to settle, and rubbed with sugared ale, will *sometimes* decoy swarms to reside therein. But this must *not* be relied on; for it often happens that bees previously choose a place, that they have made clean for their reception, and to which, on rising, they immediately repair. But a hive of old combs will certainly allure some of

your own swarms to settle therein, if not of some strayed ones.

If a swarm is too *large* to be contained in a hive, immediately double it; but if it is a common hive turn it upside down in a bucket, &c. and lay two flat sticks across, and set another hive over it; then take them from the bucket, and set them on four or five rounds of an old straw hive *doubled*, as they are, and in the evening place them on their destined station, stopping the joining with clay, and allowing a proper doorway.

When swarms seem restless some time after hiving, as often happens from their having two princesses, and being undetermined in their choice; take them to a dark apartment, when the bees, supposing it near night, will presently elect the most promising lady, and expel the other.

It is very likely that the old queen sometimes accompanies the first swarm. The reason perhaps of there being *no tooting preceding the first* swarms, is there being then but one young queen qualified to lead them.

When

When more *royal cells* than one are perceived in a hive, the supernumerary ones may be taken out to make a swarm, if wanted.

Bees, when swarming, are generally very peaceable, as being under many fears and apprehensions; so that they may be hived with much ease and little danger (unless the wind is high), if they are treated with gentleness.

If they seem inclined to rove beyond the proper bounds, handfuls of sand, dirt, or the like, should be thrown up among them: water also cast among them will induce a speedy clustering. The same *means* should be used when two swarms rise together, and fight in the air. A great noise should be made, especially that of a gun, to intimidate them.

If several PRINCESSES rise with *one* swarm, when hived together, great commotions ensue, until one of the princesses is cast out or killed.

But when they cannot decide in their choice, they fly out, and continue the contest; or, which is most frequently the case, different parties cluster with the lady they

approve, and settle separately. Let them alone till they are severally settled, hive each parcel separate, afterwards strike them out on a board one after the other, and take the queens from each, all but the largest cluster, to which put all the rest. Or otherwise, at the close of the evening, *fume* them *all together*, when the first princess that recovers will be acknowledged queen, and the rest expelled or slain by the morning.

STRAY SWARMS are often perceived flying in the air, and may be allured to settle (especially if tired with flight) by making some kind of tinkling with a knife upon a fork, shovel, or the like; and when settled, may be brushed into a hat, handkerchief, or part of the garment, which being gathered up by the corners, may safely be carried home, and laid on the ground, or table; laying a stick across; and placing a hive over them, they will assemble therein.

When a *swarm* settles in SEVERAL CLUSTERS, hive only the *largest cluster*, and remove it, a small distance at a time, near to the smaller clusters, which are successively to be shook off the places of clustering by a

long hooked stick, repeatedly, till the buzzing of those in the hive has attracted their notice, and induced them to join. If the clusters are equal in bulk, hive both separately, and set them at a small distance from each other; and if either of them have a queen, and are dissatisfied with her, they will quit the hive, and unite with the other; but if both remain contented, unite them by fuming.

Swarms should be hived as *soon* as settled: for their clustering is generally but of short duration; especially of prime swarms, or if they have previously selected a place of residence.

When a swarm attempts to *settle on a person*, standing or walking, &c. let him not be alarmed, nor in any wise oppose them, but lift the hat a little above the head; perhaps they will settle on that: if not, cover your head and face with a handkerchief for them to cluster on. But if, contrary-wise, they begin to cluster on the shoulders, or under the handkerchief, fling it off, and spread your hands over the eyes and face, and thus re-

main *entirely passive*, till the whole have fixed, which, if this is punctually observed, will be done without a single sting. Then retreat with leisure to some room in a house, made nearly dark, and then a person must hold a hive, pan, sieve, &c. (sprinkled with sugared ale) over the cluster, with the edge just touching it, which will, after a little while, induce them to ascend into it. Blowing with *bellows* will cause them to do it the sooner, without irritating their propensity to sting. But if any violent or offensive means are used, it will provoke their revenge so as to be dangerous.

When a swarm is clustering, and ANOTHER is rising and endeavours to join it, cover the first with a thin cloth, and throw dust, or water, among the others, to cause them to settle elsewhere. As likewise if a *swarm that is risen* attempts to settle on a stock hive, stop the door, and cover the hive with a cloth. Sprinkle an empty hive with sugared ale, and place it a little raised over the top of the stock, and the swarm will enter therein. If the swarm seems too large

to be contained in the hive, set another upon the first. As soon as the bees have entered, take it away, and unstop the stock.

OR it may be done by stopping the door of the stock, and immediately removing it to some distance. In the interim an assistant is to place an empty hive in its place, to which the swarm will enter ; and then it is to be taken to an appropriate stand, and the stock brought back to its former situation.

SWARMS will sometimes cluster on, or enter, *improper places*, as under roofs, or other buildings. Immediately a hive is to be placed close by, or just about the hole of their entrance : encompass the hive and bees with a cloth, and it is very likely after a little time they will give the preference to the hive. If not, put a piece of paper with holes made in it over the bowl of a pipe of *tobacco* ; apply the end to a small hole made just under where the bees entered ; take the empty hive away, and then blowing forcibly, the smoke will generally induce them to fly out, and cause them to settle in a more convenient situation for hiving.

To avoid repetitions, I would observe, that the GENERAL RULE in conducting operations about bees is, that they be executed without noise or talking in approaching the hives, till the doors are *secured*; otherwise the bees will be alarmed, and guard the doors immediately. A leisurely and calm deportment, with gentleness yet boldness, and giving the least disturbance, will greatly conduce to render the business easy and safe.

In HIVING take care that none are *crushed*, as that provokes the others to revenge; and not only so, but it may chance to be the queen, to the ruin of the swarm. Forbear the use of weeds, or throwing water on them, when clustering, or brushing them off, which they will highly resent; and it may make them fly quite away. Gently cut away all spray twigs, or branches, that may obstruct the placing the hive under the cluster. Always *spread a cloth on the ground*, with two small wedges on it, as near the cluster as may be: the wedges are to keep the edges of the front of the hive a little raised, for the more ready entrance of
the

the bees underneath; as also to prevent injuring any of them.

It may be remarked that swarms often settle *without a queen*; which, therefore, proves, that it is not the queen that leads and begins the cluster. Most likely those that are most inclined settle first, and the rest naturally follow; as sheep through a hedge.

INSTRUMENTS necessary for hiving are, an empty *box* or *hive*, a hive floor, or loose board, a large cloth, two small wedges, and a long fork, or crook-stick.

TO HIVE BEES, let the apiator take the hive inverted, and leisurely introduce the hive under the cluster as conveniently as can be without disturbing the bees; then with the left hand give the bough two or three smart shakes, which will cause the greater part of the cluster to fall into the hive: *nimbly* take it away, and turn it on one edge on the floor, and the other on the wedges; draw the cloth up over the hive, leaving the raised part open. The bees, as may be expected, will be in great confusion, and make a great buz, but will immediately
begin

begin to ascend : the bough, or bush, &c. must continually be shook by the long stick, whilst any bees endeavour to relodge on it : those on the wing, hearing the buz of their companions in the hive, will gradually fly down and join them. Let them remain on the spot till the evening, unless the sun should be too violent ; and then the heat would make them *quit* the hive, unless sheltered by boughs, or the like. But if it should be inconvenient for the hive to remain, they may be removed a little way off. As soon as the bees are nearly retired into the hive, the hive may be carried to its destined stand ; the few bees that remain on the wing will return home.

Whenever bees are so clustered that a hive cannot be put under them, lay a cloth under, or as near as circumstances will allow ; shake the bush, &c. to make the bees fall, and keep so doing till the bees relinquish it : when down on the cloth, or ground, set a hive over them, and they will enter.

OR, should a swarm settle on a hedge, &c. that a hive cannot be set under them, it may
be

be placed OVER them: this do by forked stakes, or cords; and by flinging a cloth over the bees and empty hive, they will in some hours ascend. But for fear of mischance, they should be *watched*. Or if they are found not to ascend, set the hive three parts over a floor, then with a *spoon* very tenderly take up some of the bees, and turn them out on the floor, within, or near the door of the hive (its edge being raised by a wedge): repeat it as long as the bees will permit without showing much resentment: the buz of those already entered (the larger the number the better) will the sooner allure the others to do so. But if the bees are fractious at first, introduce only a spoonful or two at a time; and in the intervals retire out of sight.

Or to prevent a swarm from CLUSTERING INCONVENIENTLY in a hedge or bush, immediately lay a handkerchief or hat on the bush: probably they may settle on that, and may afterwards be laid on the ground; and a hive being placed over, they will most likely embrace the offer.

BEES clustering round the BODY OF A
TREE,

TREE, OR POST, are difficult to hive. Take a *hive* and *floor*, or board, and place it by means of forked sticks, barrels, ladders, &c. or with cords, so that the floor may be on a level with the bottom of the cluster: then raising the edge of the hive next to the bees, by wedges, gently advance the hive so as slightly to touch the cluster: this in a little while may induce some of the bees to enter, and the rest to follow. But to save time, use the *spoon*, as before directed, to diminish the cluster, and increase the buzzing in the hive: at times disturb the cluster, by gently shoving a small stick among the outermost, to disengage them. As soon as a considerable number have entered, the rest will surely follow; though, perhaps, but slowly; unless the queen has been one of those conveyed by the spoon.

Should swarms fix on the EXTREME BRANCHES or twigs of high trees, beyond the reach of the hand, a hive, or rather a light basket, must be suspended to the end of a long pole or fork. Then having a ladder, introduce the basket under the cluster, while an assistant with a long crook smartly
shakes

shakes the bough, by which a great part of the bees will fall into it. It must then speedily be brought down, and turned upside down on a cloth ready spread, on which many bees already fallen will be settled. In the mean while the branches must be constantly shook, by which the bees, finding no quiet there, and hearing the buz of those underneath, will descend and join them.

Or, *another method* is to tie twigs to the end of a long pole, and therewith disturb the cluster till they take wing again ; when probably they will cluster in another situation more favourable, if treated with the usual music.

A third means is to hold a pan of smoking substances, which may make them glad to move their quarters.

When swarms settle ON LARGE BRANCHES of trees, too stubborn to shake, a hive is to be set on a floor, and fastened with cords, that the floor may touch the cluster. Then treat them as before mentioned.

A swarm in a HOLLOW TREE that has not been lodged therein more than two or three days, may be displaced, by carefully stopping

ping all the holes, and crevices, except that which they entered by ; then fixing the bottom of a hive against their hole of entrance, securing it firmly with cords, as also tying a cloth round the joinings, that no bees can escape ; beat with a large hammer, or great stone, violently about the tree just below the hive : probably this will terrify the bees, so as to induce them to seek security in the hive. Now and then cease the noise, and listen whether they make a buz in the hive ; and repeat the hammering until the buz is greatly increased. Then, loosing the hive from the tree, set it on a cloth spread on the ground, and repeat the strokes and noise on the tree till but few bees rise. Stop the hole of the tree, and those on the wing will rejoin their companions.

But if they will not *take to the hive*, make a hole with a chissel, near the upper part of the hollow (for the bees generally lie as high as possible above the entrance) : place the hive just above the hole cut, and by hammering it will cause them to fly furiously out, and take to the hive, or settle in a more commodious situation. But if they should
have

have settled below the passage hole, make the large hole *below* the cluster, as near as can be judged, by striking where the buz may direct.

If these methods prove unsuccessful, recourse must be had to *smoking rags*, damp straw, or cow dung, put into the hole, if it be made large enough; and at the same instant hammering under their lodgement, or teasing them by thrusting twigs up till they fly out. Perhaps (for I have had no opportunity of trying) if an opening could be made large enough to receive a pot of fuming *puffs* under them, for about twenty minutes; by confining the smoke, probably the bees might be so stupefied as to fall to the bottom, and might carefully be taken out, by a ladle, or spoon, and put into a hive, and immediately carried away, and placed in a dark room or out-house till the morning. The chasms of the tree should be all stopped to prevent the bees from returning to their former lodge. The longer bees have settled in any place, the less disposed they will be to quit it; especially if they have made combs, and have brood therein.

therein. They will sooner die than quit it. In such a case it is better to let them remain till autumn; and then suffocate the bees and take their treasure.

Bees in the holes of walls may be treated after a similar method.

But when bees have settled under the *roofs or vacant parts of buildings*, where sparks of fire might be dangerous, fuming must be avoided; and instead thereof WATER must be conveyed over the bees, by the rose of a watering pot, funnel, or pipe, taking some tiles off, or boards down, to come at them; which will often succeed as well.

Where WINDOWS have been left open, swarms sometimes assume the liberty of taking possession. To secure them, first shut the window and door; then holding a hive under the cluster, draw a wire or thin stick gradually between them and the ceiling, or part to which they are attached: this will cause the bees to fall into the hive; which being set on the floor, the stragglers will soon hear the buz of the others, and rejoin them, and the sooner if the room is made *nearly dark*.

All

All swarms, if the weather is fine, will begin to work as soon as hived; but if the two first days prove foul, it discourages them from labouring for several days, even if then it should be fine. But in a long continuance of bad weather, they will *perish*, unless relieved by a timely *feeding*.

The foregoing *directions*, it is presumed, will be fully applicable to all other cases that may arise, though attended with some variation.

CHAP. XIII.

ARTIFICIAL SWARMING.

I AM sorry to declare, that I have met with no *invention*, among the *many* that have been published, or among the great number of my own devising, for artificial swarming, ADAPTED TO COMMON USE, or that has been in general successful. From so great a disappointment, I am inclined to draw a conclusion, that as nature has implanted in bees a strong propensity to swarm, as a quality necessarily connected with the manner and season ; all our attempts, by *force* or *allurements*, to *effect* or prevent it, with a tolerable degree of timely advantage, must prove ineffectual. I propose the two following methods, however ; as, if not successful, they will not be prejudicial to the stocks, may amuse the *curious*, and be accomplished without much trouble. But they are *inapplicable to general practice*.

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By often looking through the windows of storied boxes, in the swarming season, SOMETIMES a queen may be seen in one of the boxes. *Immediately* shove a divider between the two boxes. Leave them about an hour ; when if the bees of both boxes remain quiet, wait some time longer, and then repeat the inspection, by intervals, two or three times, till the approach of night ; and if they are still in a quiet state, introduce the other divider, and take the duplet to a distant station. On the contrary, if the bees of *either* box have showed signs of discontent, it is a token there is no queen in that which shows uneasiness ; and therefore the divider must be withdrawn, till another favourable opportunity offers.

The SECOND METHOD is : In the swarming season, when the bees seem very numerous, and show indications of swarming, shove a divider between a duplet in the morning, having before opened both doors ; and if the bees remain quiet and pursue their work, in both boxes, till the evening, proceed with them as above. But if the bees

of either box are confused, take out the divider, and try your fortune another time.

An artificial swarm may be made, by purchasing one or more of second or third swarms of your neighbours, as they will be of little value to them, and therefore may be had cheap. Unite as many of them in one hive, as are sufficient to form a good swarm, by placing the fewest in number to the most populous; fuming them first to prevent quarrelling. But if such should happen, fumigate the duplet.

CHAP. XIV.

OF WILD BEES IN WOODS.

IN February and March bees are very frequently numerous, on fallows, osiers, and other plants that afford farina, in woods; which is a sure token that their habitations are not far distant. They may be easily traced; and having found them, mark the place or tree. Aged people, or children, may be set to watch their swarming, and they may be hived in the usual manner. For whether in hollow trees, or any other habitation, bees equally cast out swarms, as well as those in hives. Having secured and carried away the swarms, in autumn repair to the same spot, and take the summer's produce, as directed under hiving.

If this early attention has been neglected, make observation in woods on those places which are most plentiful of bee-flowers; or, in very dry weather, of watering places, to

which, in such seasons, they will be obliged to resort. If their abode is too far to be traced, dissolve some red or yellow oker in water, and, dipping some sprigs therein, sprinkle the bees therewith as they alight. Being thus marked, they will be easily distinguished. For, by observing whether returns are sooner or later, or whether in greater or lesser numbers, a tolerable guess may be made; especially after a little practice. A person having a watch, may by it more accurately determine this point. A pocket compass will also be greatly assisting to certify their course, which is always in a direct line to their habitation in their return home.

If this method proves not successful, take a joint of a large reed, or of kex; force a part of the pith out at one end, and do the like at the other, only leaving a small partition between the two hollows; cut a small slit over one of the hollows, put some honey made a little damp with ale in the hollow, and stop the end with a cork, or paper; and if fire can conveniently be had, melt some wax on the tube, the smell of which will be waisted
by

by the wind to a great distance. Place this joint near their haunts, and they will soon be allured to enter into the hollow. When about eight or ten have entered, stop the end with the finger; soon after let one of the bees out, pursue it as long as it is in sight, and then let out another. If it continues the same course, follow that also; but if any take a different route, let another fly, and so proceed till you find several take the same course, which will lead to their nests.

The bees that pursue other directions probably belong to other nests, which may be discovered by the same process as the first.

If it be necessary to take the combs out directly, a pot of fuming *puffs* should be introduced under them by a hole made on purpose. During the fumigation forcibly strike the tree. If the whole are not fallen from the combs, they will, however, be so lethargic as to give the operator but little annoyance, if he has on the bee-dress. The combs are to be taken out as whole as possible, and placed in an empty hive, and supported by as many splints as are necessary, in the best

manner the nature of the case will admit of. The stupefied bees which have fallen into the cavity of the tree, may be taken out by a spoon or ladle, and put to the combs in the hive; which had best be set on a floor before the combs are put in, and then the *bars* and cover, and may be removed without much trouble or displacement.

If puffs are not in readiness, the smoke of dried cow-dung, damp straw, &c. may be used, which will be likely to force the bees out; when, settling on some tree, &c. they may be hived, and, on being carried home, may be set over the hive of combs.

If the nests are taken during the swarming season, those parts of the combs that have honey in them may be cut out, taking great care of those with brood, which, with the empty ones, are to be placed in the hive, as well as can be in the same manner and at the same distance as the bees do; and placing the bees in them, they will soon repair the damage, and furnish the hive afresh.

When the bees are esteemed not worth preserving, rags dipped in melted brimstone,
and

and put under their nests, will immediately suffocate them.

Hives rubbed with honied ale, and some poured into an old comb, and put under them, and placed on those spots which bees much frequent, will be likely to allure swarms to settle therein.

Having had no experience in what relates to this article, the above is given from respectable authority.

CHAP. XV.

SALVATION OF BEES.

MANY of my readers will be much surpris'd at the following declaration, viz. That the SUFFOCATION of bees kept in *common hives* is *not* prejudicial to the interest of the owners. This assertion, I beg leave to state, relates *only* to those who keep bees in SINGLE HIVES, WITHOUT STORIFYING.

Contrary to my former principles, prejudices, and practice, and to the current opinion of writers, nothing less than a series of stubborn facts could have effected my conviction and recantation.

From theoretic deductions, to facts I appeal;—to experiments, the justness of which the judicious apiator may be convinced of, by making proper observations. For those who keep bees in boxes, with large windows, may perceive that in December and January very few bees are to be seen in the boxes that were crowded in August. Those who
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have straw hives may, at that time, safely turn them upon their edge, and have a tolerable view, to answer the above purpose. The diminution is so great, that the fullest hives or boxes are then reduced to about a QUART! and this by the natural decrease of the aged bees. To certify this, I took the bees from several hives, and found them to measure as by the above statement; the weaker stocks less in proportion.

This result proves, that all the advantage obtained by saving the bees of STOCKS TAKEN, and uniting them to other stocks (the only eligible means of saving), is ultimately only the *salvation of a quart*. And as the queen must be killed by the hand, or by the stock bees to which they are to be united, they cannot possibly make any *further increase* in the spring.

The question is then reduced to this issue: Whether the multitude of bees, united about August, will not consume (though gradually diminishing) more honey before the spring gathering commences, than the quart left will compensate by their labour?

Besides,

Besides, it is to be considered, that the eggs produced by the old queen of the stock, not being more than usual, want not an unusual number of workers to rear them; a greater number may possibly be useless, or prejudicial by the increase of consumption. Nor do they contribute to the production of more early swarms; for that depends on the early birth of princesses, in which the additional bees have no share.

The truth of the fact is further confirmed by experiments on stocks that have the bees of other hives united to them, but which proved neither more *forward* nor more *productive* than single ones hived in the common way, not only of my own, but of neighbours.

On the contrary, *STORIED* stocks, in the same season, were abundantly more prosperous, having provided themselves with means sufficient for their own prosperity, in a succession of peace and plenty, and without the cruel *necessity* or *trouble* of *suffocation* by fire and brimstone.

From

From this declaration it by no means follows, that the *old practice* of suffocation can be justified ; but must be condemned as impolitic, and highly disadvantageous ; *for they must be very weak who pursue a plan of conduct of small profit, when a better is offered of double or treble advantage.*

CHAP. XVI.

BEE GLASSES.

THE most convenient shape to set over bees, should be similar to those of pl. 2. fig. 1; that is, perpendicular to the circular top, or straight dome.

Four are designed for a box, *one* at each corner; and *one* in the middle which is to hold *two* quarts; the others, only *one* quart each.

That of the centre should be in two parts; the lower part to be open at both ends; the upper division of the glass to be circular at top. There must be a thin circular piece of wood, of proper dimensions, to lay over the top of the under glass, to support it when set over, and in it three apertures, cut out from the middle, by which the bees are to ascend into the upper half of the glass.

It will be necessary to have an ADAPTER, or board of the size of the top of the box, on which the glasses are to be set. Apertures

are to be made in it, to correspond with those on the hive-top, but to be limited in length, and not to exceed the width of the glasses, as pl. 2. fig. 3.

Instead of sticks to support the empty combs, STAGES seem preferable. Three slips of wood, an inch and a half wide, and of a length to suit the bottom of the glasses: small holes are to be made near their edges, to receive long pegs, or slight sticks, about three or four inches long, and thus form *stages* wherein to fix the empty combs. The bottom edges, and ends of the stages must be round, or bevelled off, and the ends of the pegs are to be cut smooth with the surface, to prevent any impediment to the entrance of the divider. The small glasses require two such stages; the larger central, *three*, in each division; and to be placed so as not to obstruct the apertures of the box by which the bees must ascend into the glasses.

OBSERVATIONS.

When the glasses are filled with combs, the edges are to be cut through with a thin
knife,

knife, close to the glass; and a stiff wire, bent like an L, with its short end made flat and sharp, is to be introduced between the combs. Give it a twist, to turn the flat end, so as to separate the upper part of the combs from the top of the glass. The glass of two parts is intended for the conveniency of taking the upper part off when full, and to be succeeded by placing another. All glasses are difficult to crawl up by the bees, occasioning extraordinary labour. In small glasses especially, the crowds entering with their load, after much struggling find it not wanted there, nor perhaps in several others; and after all this toil are obliged to descend with it into the hive. For this reason, I have advised none under a quart. But to those who are *not* anxious about quantity, small glasses to their own taste will be more pleasing. The greater the number of glasses, or their magnitude, the greater should be the proportion of bees to fill them; or the box will contain mostly brood, and very little honey. An *addition* of a good swarm or two is, in that case, necessary.

Those who have large globular glasses may
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have them cut in two (by the glass-cutters), and have a division board adapted to the under half, as directed for a central glass.

It may be thought that, by the use of glasses, the queen might be often discovered: but the reverse is true; she very seldom visits them, having no business there, brood hardly ever being found therein. *Once* I had some in a large globular glass, owing to want of room in the box below. The drones often ascend in the glasses to repose themselves. Glasses do not *prevent* swarming, for I have had swarms rise, even after they were half filled.

MANAGEMENT.

To place glasses over a box, set them as in pl. 2. fig. 1. properly upon the *adapter*; slide the divider under the cover of the box, and set the adapter and glasses on the divider; then holding it steady with the left hand, withdraw the divider by the right. Then cover the whole with a dark-coloured cloth. It is proper to omit inspecting them for two or three days. Any chasms that may

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happen

happen by the glasses not fitting close, or by not being wide enough for the openings, may be covered by slips of bohea tea-chest lead.

Glasses may be set on straw hives, by having a *circular* adapter set over, as before mentioned; only be careful that the glasses do not stand too near the edges, so as to prevent the body of a straw hive from surrounding them, or the straw cover from being laid over; and which may be removed at pleasure for inspection.

No glasses ought to be set over stocks, until a duplet is about half full, lest the after-season should prove unfavourable for storing the boxes. No glasses should be set over *weak* stocks. About the tenth of July glasses should be taken off; but if duplets are well furnished, they may be safely admitted so long as the bees continue to place honey therein. In case the bees of a duplet lie out, take the glasses off, and raise the stock on a nadir.

In *bad seasons*, glasses cannot be filled without too much impoverishing the stock; probably to their utter ruin.

In four or five days of bad weather, the bees will feast on the honey of the glasses; to prevent which, take them off. But they must *not* be put on again, on a favourable change; for they will take the rest of the honey; although, when done, they will refill them. Therefore put on fresh glasses, with *empty* combs.

The glasses should be taken off as fast as filled, and replaced by empty ones, or the openings covered with tea-chest lead.

Two slips of double *tin*, each about half an inch wider than the bottom of the largest glass, are necessary to take the glasses off by. Slide one under the glass to be separated, and the other under the first; then withdraw the upper tin, with the glass thereon, while the other is kept close and steady in its place, till an empty one is set on. The glass taken off is to be conveyed to a darkened room; and turning it on its side, towards the light, the bees will fly directly thereto, and soon quit the glass. If they do not, tapping on the sides with the hand, or blowing with a pair of bellows, will make them soon relinquish it. Small glasses are

to be taken off in the same way; but by taking them to three or four yards distance, and tapping with the fingers on their sides, with the bottom upwards, and gradually walking on, the bees will escape without anger or danger. Or they may be laid on their sides on the ground, and the bees will quit leisurely of themselves.

These operations will be rather an *amusement*, than acts attended with fear, when a little practice has made them familiar.

Spare virgin combs should annually be reserved for decoys to the glasses. They should be kept in close boxes, or drawers, in a dry room, wrapped in papers, that neither dust nor the *wax-moth* may injure them.

CHAP. XVII.

DEPRIVATION, OR THE TAKING UP OF HIVES
OF HONEY.

DEPRIVATION is either partial or general: the **PARTIAL** is that of taking hives or boxes as soon as they are judged to be full. When a stock has been so prosperous as to have the **TRIPLET** full, it must be then taken off, and another triplet set in its place; but the duplet must remain, while a continued separation of triplets may be made as often as they become filled.

To *know* when straw hives are nearly filled, strike round the body, and if it feel hollow, and a small buz be heard, it is a sign of their not being near full; but if it feel solid, and dead to the strokes, and a great buz of some continuance follow, it indicates its fulness.

Through the windows of boxes this may be discovered at sight.

Triplets are to be taken so long as the season and weather are favourable for pro-

ducing honey; otherwise the stock must be *raised* on a nadir. Place the hive taken, a considerable distance from the stock; and if in two or three hours the bees remain quiet, there is a presumption of its having a queen, or brood, and it must be set on again. But when all the three hives appear crowded with bees, so as to want more room, set the hive that was taken, with its door as near as can be to the stock door, so as not to obstruct it; laying a slip of wood as a bridge from one to the other: and place an empty triplet on the stock. The hive being placed thus near to the stock, with its floor touching, will be esteemed still as one family, and the brood reared as such; and in about three weeks may be taken away. The brood in that time will be matured, and the cells filled with honey.

But in the interim, if an unusual crowd or disturbance, or crumbs of wax, are seen at the door, it is a token that the stock bees, or some others, have begun to pillage. Observing this, take it directly to a dark room, and cover it up for a few hours: if then the bees are quietly escaping, let it remain till morning,

morning, and then fume it, whatever be the state of the bees.

But if, after the triplet has been taken, the stock is in confusion, it is a sign that the queen was therein (though this seldom happens), and it must be replaced. This CAUTION is particularly necessary to be observed, in respect of all hives when taken; as sometime a *young queen* may reside in one hive, and the old one in another; or the old queen may be in it herself. This is often the case with duplets which have farina and brood; and that even though the upper door had been timely shut. *Generally*, when a nadir is half full of combs, and the door of the upper hive has been kept shut, the queen begins to lay her eggs in the nadir; therefore, in about three weeks after, the brood in the superior hive will have been hatched, and the cells filled with honey, and proper for taking. No DUplet is to be separated in autumn, unless the hive left, in all appearance, is quite full; then that which seems most likely *not* to have the *queen* may be taken; but if this cannot be determined, it is most eligible to let *both* stand. The bees

will not be the worse for having more food than is necessary (if kept warm in winter) ; but may perish by having too little, which may happen in a protracted bad spring.

Bees will *not quit* a hive that has *brood*, whether upper or under, without fuming or driving. The following day after a hive has been separated, if farina has been carried in, it shews all is well ; but if not, return the hive that fails to the stock again.

When it happens that a *separated hive has a queen*, and is well stored, it may be kept, if such an increase is wanted ; provided the stock left has also a queen. But if, unfortunately, the stock queen has been killed in the operation, restore the hive taken, to its family.

THE BROOD COMBS of hives taken, should be handled with great tenderness and circumspection, that none may be damaged or crushed. Rather cut into the honey cells than into the brood ; and let them be kept warm, until they are set over a stock. Place them in an empty hive reversed, without its cover ; the combs to be disposed so as to touch each other as little as possible,
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by placing slips of wood, half an inch in thickness, between, to give sufficient space for the young to be excluded, and for the passage of the bees to nourish them. At night set them over the stock they came from, or some other that needs recruiting.

Deprivation should always be done in the evening, as soon as the bees are retired to rest; that there may be sufficient light leisurely to perform the operation.

THE GENERAL TIME OF DEPRIVATION, OR TAKING UP OF STOCKS, varies in different *counties*, according to their different temperatures; but about the latter end of August is the usual season.

Bees kept in *single hives* ought to be taken when honey-gathering begins to cease. This may be known by a diminution of activity in the bees (if not from bad weather); for, when this happens, they begin to feed on the hive honey, beginning with the unsealed or exterior cells first. Therefore, the *longer* they are permitted to stand, the *less* honey there will be in the hive, when taken; and that in proportion to the number

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ber of bees it contains ; which at that time consume a great deal in a little time, and consequently prove an absolute *loss*. This is meant of stocks taken the *common way to be destroyed*. What hive honey they have eaten can be of no profit, when the bees themselves are soon to be killed.

But this is not the case in the STORY METHOD, the bees of which are always saved ; and therefore no *disadvantage* can arise from their standing. For if a duplet that has stood be taken after having eaten a good part of the honey, it has saved a like quantity of the stock's, which they would have consumed, had they staid on.

At the usual season of deprivation there is *generally* much brood, whose preservation is of much importance : for, coming INTO BIRTH so late in the season, they will survive through the *next summer*, till the honey harvest terminates. *This brood, thus preserved, is of more worth than twenty times the number of promiscuous bees, taken from a stock, and incorporated with another*; even if the stock should prosper, which is very doubtful, as experience verifies.

It is surprising, that the *salvation of the brood* has never been noticed ; although every one, on taking combs out at this season, might have observed brood therein, in their several stages of maggots, or nymphs, and often of eggs. Regardless thereof, they are mashed indiscriminately with the honey-combs ; thus greatly injuring its quality by such ill-judged conduct.

In the *storiéd method*, instead of the general deprivation of *duplets in August*, I apprehend, for the reasons above assigned, it will be eligible to defer it to the latter END OF SEPTEMBER, or the beginning of October ; or till the weather is too cool for the bees to work much out ; by which time all or most of the brood will have been matured, and have left their cells, without the risk of destroying any of them : besides the advantage of performing the operation with more ease, safety, and satisfaction ; as at that time, from having neither brood nor princess, the bees will quit the duplex, when separated, in a few hours, of themselves, without fuming.

In wet and cold seasons, honey-gathering

is very scanty; a circumstance which leaves numerous vacant cells for the rearing brood, and thereby renders *deprivation* much later than usual. For the hives may feel heavy, but it will not be from honey, but mostly from farina and brood (especially if the stock is of two years standing); which may lead the apiator into a fatal error, as thinking the stock *rich*, though in fact it may be *very poor*, and die of famine in the spring. Stocks left double are not liable to this casualty.

TO JUDGE OF THE WEIGHT AND CONDITION of a stock fit for standing, besides the direction given before in this chapter, lift the stock a little up: if it feels of a due weight, that is, about twenty pounds exclusive of the hive, it may be safely concluded as fit to keep.

It will be useful on several occasions to *number and weigh* the hives and floors, before the bees are put in. By this means, any evening, by stopping the hive door, they may be readily weighed, without any disturbance to the bees.

If any of the stocks remain *trebled* till August, take away the most empty; for it
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is adviseable, that the stocks, in general, be reduced to duplets at this period. Those that have but few combs, are obviously to be taken. In a cold evening or morning, an assistant may lift the hive high enough up, to permit the apiator to look underneath, which he may do with little danger, or disturbance to the bees. The doors of all duplets that seem most vacant should be shut.

All stocks in common hives, that are light, should be taken; and none kept, unless about twenty pounds weight. Weak stocks seldom survive the next spring; but, if by chance they do, turn to little account, not adequate to the trouble and expence of feeding. One strong stock will be more productive than four weak ones. Nevertheless, in extraordinary situations and seasons, they may yield tolerably well.

In favourable seasons three hives have been taken off, each yielding twenty pounds of combs, though in a situation that was but middling.

Two or three casts joined together, have accumulated honey very rapidly; while
○ their

their feeble neighbours, having few collectors, lost that short but precious opportunity.

It is best to SEPARATE *boxes* about ten in the morning, when the greatest number of bees are out; as it can be done with more ease and security than in straw hives.

In small apiaries, the divider had better be shoved under a hive the night before, and then the bees will be so little disturbed as hardly to resent it.

When bees are terrified by the operation of deprivation, or other violence, they become regardless of their queen, till the panic has subsided. At the season of deprivation, the light stocks had better be incorporated, three or four, at discretion, in a hive, and proportionally furnished with honey.

CHAP. XVIII.

OF PASTURAGE, OR BEE-FLOWERS.

A PLENTIFUL assortment of bee-flowers is a consideration that requires attention, if we design to favour an ample production of honey. The *nearer* the pasturage is to the apiary, the *more* journies the bees can make in a day, and consequently the sooner they will be able to fill their hives.

The PRODUCT from a *large* supply, but at a *small distance*, and in a *temperate situation*, even with the *common management*, will be superior to that of the most skilful in a *bad one*. On the contrary, with bad management, and with scanty pasturage, and indifferent situation, a very *trifling profit* can be expected.

BRITAIN in general is but thinly stocked with bees. Few farmers in comparison esteem them worth their notice ; it is from
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the attention of COTTAGERS we derive the chief supply of honey and wax. It will be readily admitted, that a large number of stocks kept within a small circuit and in a bad situation, will be prejudicial to *that* circuit, as being more than can be supported in affluence; and will necessarily impoverish each other. The state of any particular situation may be known by the general product for several years together, and not from one or two years only; but more certainly from what a very good season will produce, which may be accounted as a standard.

But there are *many situations* capable of feeding a much larger number of stocks than are to be found on them. However, if the generality of farmers and cottagers individually would keep a few stocks, nearly all the honey and wax this country could produce might be collected. This would not only benefit individuals, but might also be of real *national* utility.

In many counties, cottagers' wages are *too low* to enable them ever to purchase a swarm or stock of bees, especially if they
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have families. It is a *prudent* and commendable method they have *here*, of giving credit for a swarm, to be compensated for by the *first good one* that it yields the next year, and about a quart of honey for interest. I hope this *practice* will become GENERAL, among these industrious and useful people. I flatter myself that the well-known benevolence of the BRITISH GENTRY will induce them to assign some part of their influence to promote it.

LARGE HEATHS AND COMMONS, surrounded with WOODS, are noted for being abundantly productive: the *first* abounding with wild thyme, and various other flowers untouched by the scythe; and the other with a profusion of farina and honeydews. Heath and broom are very serviceable, as continuing long and late in bloom.

It is remarkable that the domestic bees are very *nice* in their selections, and do not rove from one sort of flowers to those of another, indiscriminately. They are limited to a few kinds. Those of the most gaudy colours, and which afford the most

L resplendent

resplendent show, and agreeable odours, are mostly neglected by them, as hyacinths, jasmynes, roses, honey-suckles, &c. while very small flowers, or those of little note, are to them plentiful sources of nectarous sweets.

A List of Bee Flowers.

Winter aconite, laurustinus, hazel, snow-drops, crocus*, fallows, osiers**, primroses, hepaticas, violets, standard almonds, single wall-flowers*, onion, gooseberry, apricot and other fruit trees, laurel, turnips*, all the species of brassica, or cabbage*, dwarf-almonds, rosemary*, strawberry, tulip, white-thorn, heath, gorse, star of Bethlehem, borage*, viper's bugloss*, raspberry*, laburnum, tacamahacca*, columbine, barberry, bean, yellow lupine, syringa, sweet-brier, mustard, tares, white clover**, cucumbers, greek, valerian, fenna, French willows, holly-hock, serpyllia or creeping lemon thyme**, capers, white poppies*, mignonette**, blackberries, lime-tree*, chestnut, mallows, hyssop, teasle, buck-wheat,

wheat, nasturtium, yellow vetches, saint-foin, alders, scabious, fun-flower, broom, Michaelmas daisies, winter savory, Jacob's beard, purple house-leek, tree-ivy; and a few others of less note.

Those marked with * are such as produce the greatest quantity of honey, or farina; and those with **, such as yield the *finest* honey. Some of them afford both honey and farina. They are ranked nearly in the order they blow.

Bees are most fond of spots where large quantities of their favourite flowers are to be found together. Fields of buck-wheat, or WHITE CLOVER, will be thronged with bees buzzing their joys, so as to be heard at a great distance; while plants that afford finer honey, but scattered here and there, will be neglected. When several sorts of honey *flowers* grow near each other, they will only collect at *first* from those that furnish the best honey. For instance, if several species of thyme are planted together, they will prefer the creeping lemon thyme *only*, as long as its flowers last. In seasons of *scarcity*, they are obliged to take up with

species of a very inferior quality, and such as they would despise at another time.

Besides the acquisition of honey, FARINA is of great importance to make bees flourish. It is the *dust* or flour found on the *stamina* of flowers, and which contains much essential oil, visible to the naked eye on hollyhocks. This precious concrete substance the bees collect in little balls, on their hind legs, or by the hair of their bodies. The balls, on their return home, are struck off from their legs, in its *crude* state or by biting it off piecemeal, and are deposited in their cells ; other bees often assisting. Probably the farina of different colours may be also as different in quality.

Its USE is *partly to feed themselves*, and partly to nourish the young. *That* gathered in *summer* is immediately swallowed, and by their digestive faculties converted either into *food*, or *wax* wherewith to form the combs, and which is discharged at their mouths in a *soft* state ; so well adapted is it to its intended purpose. Therefore, when a swarm is *newly* hived, little or no farina is seen to be carried in ; and a proof of this
may

may be *had*, by an attentive observation to boxes.

Wax is also drawn by the bees from the resinous and balsamic juices of trees; the purer sort from the leaves, and imported under the folds of their bellies. The bees that have the good fortune to acquire this precious article, on their arrival in the hive shake themselves very much, as though they had a difficulty to disengage it; and yet are impatient that others should do it for them. Tar and paint they will likewise load themselves with, much to their prejudice. *TACAMAHACCA* yields resin so abundantly, that the bees are very profuse of it, daubing the box windows so much therewith as scarcely to be seen through. Combs made with it are coarse and clumsy. On the contrary, those made from white clover, or white poppies, are white and elegant.

WAX FROM AFRICA is chiefly drawn from resins of the nature of turpentine substances, and for that reason bears a less price than British, which is chiefly from flowers.

Sallows furnish a larger quantity of fa-

rina than most other plants, and that as *early* as the bees have occasion for it. Rosemary is the first aromatic plant that blows; it grows wild in some parts of France, and is the cause of that superiority for which the Narbonne honey is esteemed. Mignonette yields good honey, and is valuable for its long continuance in bloom, even till November. Beds of it near an apiary will be of advantage, as will edgings of creeping lemon thyme along the borders of the garden. Single wall flowers in plenty will be serviceable. LIME TREES are not to be neglected about apiaries, serving in a *double* capacity by their flowers, and by their *leaves* which are frequently covered with honey-dews.

Neither *beans* nor ORCHARD TREES afford any great quantity of honey; as may be observed by the stocks in Herefordshire, which, *though* abounding in orchards, is not more productive in honey than other counties. In contrast to this, the borders of Cambridgeshire and Hertfordshire, and part of Hampshire, abounding with large heaths, commons, and woods, are much more productive

ductive than any other part of the kingdom. Farmers there have been known to keep from a hundred to a hundred and fifty stocks of bees.

Viper's bugloss is a plant much like borage. It is a very troublesome weed in corn, among which it is found in many places in great plenty; and is sure to make *rich* hives; it has a biennial root, delights in chalky or dry soils, and will grow on old walls.

BUT BORAGE IS THE KING of bee-flowers; it is annual, and blows all the summer, till the frost cuts it off. It affords honey, even in cold and showery weather, when other flowers *do not*, owing to the flowers being pendulous. The seeds drop, and sow themselves; the honey from it is fine.

To find the quality of the honey from any particular species of flowers, if they are in considerable quantity, set small glasses over a stock at the time of their flowering, and they will chiefly be filled with honey of the predominant flavour.

Lavender and balm, though fine aromatics,

matics, yield little or no honey in our climate ; though they do in warmer countries. In OURS, where wet and cold so often occur, the changes are so sudden (but generally not in all counties alike at the same time) as to affect the flowers in the difference of their products, suiting one sort, and not another. Lavender is a particular instance, which is very abundant, and yields a large quantity of honey late, when most others have done.

VERY DRY SUMMERS are as unfavourable, in causing the flowers to fade and die too speedily to yield much honey. Furze or gorse, in many parts of Britain, the bees collect from ; yet, in the vicinity of Pembroke, I have observed it to be entirely neglected by them : whereas, the quantity here is so large in the hedges and fields, that the product of honey would be very great. Rape is very beneficial to bees, as also turnip, and, as it is later in bloom, will be serviceable when the other is gone.

Some flowers, it is probable, contain at *once* all the honey they can furnish, and, when deprived of that, yield no more, though

though continuing in bloom much longer. As for instance, white clover. I have seen fields of it covered with bees; but in two or three days they had not a single bee on them, although continuing in bloom, and the weather equally favourable.

In very scanty seasons of honey-gathering, bees have been observed to feed on mellow gooseberries, and ripe saccharine pears; but I believe none was carried in for store.

Bees do not fly to so great a distance as has been imagined for pasturage. The hotter the weather, and greater the profusion of flowers to be found on one spot, the farther they will be allured to fly, and pasture thereon; perhaps a *mile*, or a *mile and a half*; but generally, it is most probable, they do not exceed *half a mile*. When it is cool and windy, though they are short of provisions, they will perish rather than fly beyond that distance. Instances of this I have seen in flocks in that condition, situated in a large garden; which, on being removed to the side of a large common, not
a mile

a mile distant, presently resumed their labours with vigour, and prospered.

WHERE LAND IS VERY CHEAP, it seems reasonable to suppose, that it might be *cultivated* with some of the most productive of bee-flowers ; such as white clover to stand and feed, rape, mustard, borage, viper's bugloss, strawberries, raspberries, or buck-wheat ; marshy wet soils, with fallows, osiers, or lime-trees, which would be likely to prove of more considerable *advantage* for establishing a productive apiary, than to let such lands remain covered only with four grass, rushes, furze, and briers, and such like *unprofitable* vegetables. Perhaps many persons will find their account in removing their stocks of bees to fields of clover, buck-wheat, turnips, mustard, or heath, according as the flowers are earlier or later than those of their own situation.

CHAP. XIX.

OF HONEY DEWS.

HONEY dew has in general been erroneously supposed to be a dew that falls *indiscriminately* on all plants alike; whereas the true honey dew is an EXUDATION from the leaves of a few species *only*, and that at a time when other dews do not exist. The trees and plants on which it is found, are the oak, maple, sycamore, lime, hazel, and blackberry; and sometimes, though very seldom, on cherry trees and currant bushes.

Its *time* of appearance is about ten or eleven o'clock in the morning, and its duration about four or five hours, according as the sultry heat which produces it continues. Sometimes it is found as early as seven o'clock, and though the sun does not shine out, if the preceding day and night have been sultry; or when the sun's rays are

are reflected from clouds. It is not always found in the several species at one time, perhaps only on *one* in particular.

This substance is as transparent and as sweet as honey; in fact, it is honey. At times it resembles little globules; but more often appears on the leaves like a syrup, and mostly in the old ones.

The SEASON of its usual appearance is from the middle of June to the middle of July; but varies in different counties, and according as the weather is more or less favourable. In some years there is none at all. In general, when fruit is backward, so are honey dews; even so late as harvest. There have been instances of honey dews *two* months later than the usual time, owing to the wetness of the summer, and then but small in quantity. The stocks, when taken, were light, and those left mostly died of famine in the winter; except in the HEATH COUNTRIES, which blowing late, furnished honey that was but very ordinary, and barely adequate to their winter's wants.

When a honey dew is produced, the activity of the bees is violent and unremitting:

they almost desert the hive to import it; knowing its time of continuance to be of short duration, and that on the weather suddenly changing it is entirely over.

While the trees are charged with it, the bees are *as though* swarming therein, buzzing their joys in loud acclamations. But woe and smart to those who obstruct their swift descent to their hives!

More honey will be collected in one week from dews, than in *many* from flowers. It is obvious, therefore, how *great must be the advantage of those kind of trees* in the vicinity, and from the *story method*, by which the bees may (with care) never be at a loss for enlargement to bestow the treasure in.

CHAP. XX.

DISEASES OF BEES.

COLD, foggy, damp weather, in the winter, is very often fatal to bees: for *then* having no exercise they become subject to a purging, by which they are soon reduced very weak; and clustering together in a body soil each other, and thus contaminate the whole. The signs of this disease are small crumbs of wax about the door, or on the floor, with many *dead bees*, and much filth caked together, and, if of some time standing, mouldy, often concealing destructive wax-moths, &c. If the bees do not fly out, and appear as active as other stocks, it is a symptom that they are either *dead or starving*. In Hertfordshire I had many stocks affected; but in Pembrokeshire I never had *one* diseased; owing, I suppose, to

to the strong and frequent ventilation of SEA AIR, to which my situation is exposed, keeping the atmosphere always pure.

The diseased stocks are to be taken, as soon as discovered, into a warm room. Brush away the foulness from the edges of the combs, cutting out the parts that are mouldy or black : set the hive at a moderate distance from the fire, which will revive the bees that are feeble, or torpid : as soon as they begin to move, pass among them a few drops of honied ale ; tie a slight cloth over the hive, that none may crawl out, and let it remain three or four hours, to purify the damp and foul exhalations. When the bees are pretty well recovered, give them a trough of honied ale in which the leaves of rosemary have been infused, and set the hive on a clean floor. Contract the door, so as to admit a little of the warm air. Let them remain till next day. If then the bees are few, or are still weakly, cover a dry floor with ashes, place on that a little hay, or straw, and set the hive therein, conveying it to its usual stand. Cover it well with straw, bags, &c. and notice occasionally whether

whether their condition may require further feeding; which should be given daily, if the hive is not sufficiently stored with honey and farina.

When bees fall motionless to the bottom of the hive, it indicates that they are chilled with cold, or in a starving condition. To prevent a further destruction, treat them as above, or set them to a plentiful stock.

Bees often fly in a desultory manner about the hives, bee-houses or dwelling house, in the *spring*, with lamenting tones, as though wanting something: that *something is food*; for they are almost famished. By observing which of the stocks has an unusual crowd at their door, the distressed hive may be discovered. A fresh, dry and warm floor must be given them; and they must be immediately fed: the delay of a day may be a day too late.

When stocks appear to be LIGHT, a daily feeding is indispensable, till a certainty of honey-gathering has commenced. Or a hive or box may be cut down to five inches, and filled with combs of honey, properly placed, which may last them a long while.

The

THE MORE BEES a hive contains, the greater their warmth, which causes them the sooner to become active in the spring; and accelerates the breeding of the queen, and the production of young. But the quicker also will the honey be exhausted.

And this is the reason why so many *stocks perish in the spring*, when least thought of; *if they were scantily stored*. This consideration should operate as a strong inducement to keep NONE but rich stocks.

A DEGREE OF COLD that shall throw the few bees of a weak stock into a useful lethargy, will not have that effect on one that is *populous*. On this principle the weak stock will survive; while the populous one perishes, by consuming all the honey by the increase of numbers; admitting both to have an *equality* of honey.

When *bees in cold weather* disengage themselves from the body or cluster that is in the hives, or fly out, they are presently chilled to death.

These insects suffer more through the instability of our climate, in its frequent and

M

sudden

sudden transitions, than from a long continuance of frost. The milder the *winter and spring* have been, the sooner their store is exhausted; and if it was rather short at first, the sooner the stock *dies*; or perchance it may survive till the latter end of May.

The frequent FAILURE OF STOCKS has in most counties been attributed to WITCHCRAFT, or other *superstitious* notions, instead of attributing them to their *true cause*; badness of weather, or their owner's neglect, or want of *skill*.

These causes operate alike in every article of husbandry; often blasting the fondest *expectations* of the farmer. But he will not be so absurd as to suppose that evil spirits, or witchcraft, have any power to sport with mortals, or their property, at pleasure; much less that bees in particular should be victims to their malice, more than sheep or cattle. No! he patiently submits to the *Omnipotent Disposer* of all events, from the destruction of the ant-hill to the dissolution of mighty empires.

To secure them from diseases, it will be
necessary

necessary (contrary to the common opinion) to keep the hives *warm* in winter, by filling the vacancies around and at top of the hives with straw; especially box-hives. In snowy weather, or very hard frost, the door-ways should be wholly closed, which in such a season will not be prejudicial; *provided* care is taken to unstop them immediately on the weather changing; for as soon as that happens they will be very anxious to issue out for fresh air, as also to empty themselves. Bees should always be suffered to make their exit, except as above, as they well know what weather they can bear, and how long to stay in it. It is best *not* to house bees in winter; for when a mild day comes, they will rejoice to take the air, which contributes much to preserve them in health.

The bees in winter should be disturbed as little as possible.

When bees are long confined by severe frost, or rainy weather though in summer, they grow diseased for want of exercise, and for want of emptying themselves.

The regulation of the doors of the hives

should be proportionate to the weather and the populoufness.

The warmer the hives are kept the better. In cold springs the doors should be fhut at night, and opened in the morning ; but be fure that the bees have no exit, but of the hive, or it may prove their death.

C H A P. XXI.

O F F E E D I N G.

VARIOUS have been the methods and materials for feeding bees in winter. I have found none more successful, cheap, or convenient, than SOFT BROWN SUGAR, that is not *grainy*; a pound to half a pint of mild ale, dissolved over the fire. But as sugar is at the present very dear, honey may at this time supply its place, though *inferior* for the purpose. This composition, which should be regulated to the consistence of *syrup*, comforts and strengthens the bees, preventing disorders, increasing their activity, and forwarding the brood, if given *plentifully in the spring*.

It is to be administered by means of TROUGHS made of joints of *elder*, angelica, or other kexes, slit down the middle, the pith and bark taken away, and reduced to

such a depth as easily to pass the door-ways of the hives. Their length to be eight inches, or six at the *least*, and flatted a little on the under side, and the end closed with putty, or other cement. These troughs, by passing *far* into the hive, enable the bees to come down to feed, without danger from the cold, which they would suffer in coming to feed at the door. They are also too narrow to smother themselves therein. The larger the number of bees, so much the larger must be their supplies.

When STOCKS SHEW SIGNS OF POVERTY, push into the hive a trough of the honeyed ale (by this term I always mean either honeyed or sugared ale, as may happen to be cheapest) in the evening; and if the combs obstruct its entrance, pass a long thin knife to cut a free passage. The next *evening* take another trough full, and, pulling the empty one out, push in the full one; and thus proceed as long as there is occasion. If stocks do not come down to feed, they should be taken into the house, and fed.

Such a trough holds about half an ounce;
one

one of them is enough for any stock for a day and night. This I call PRIVATE FEEDING. By this method they are prevented from feeding to excess, which they are but too apt to do, when they have an abundant supply at *once*; and thereby bring on a looseness, and prove both destructive and wasteful. Daily feeding, indeed, is more troublesome than giving a quantity at once; but the last is more expensive, and not so safe. I fed, one winter, two very light stocks, through the dreary season of 1777, till the end of the ensuing May. By the means, and at the expence only of sixteen pounds of sugar, and one quart of ale, I saved my bees to flourish in prosperity. Care should be taken to place no feeding article on the *outside*, or at the door-ways, as it will attract strange bees, who may also become robbers, and ruin the stocks.

In such a disastrous season, a PUBLIC FEEDING may be *substituted*, which is by taking an old empty comb (the deeper and harder the better), *filling* the cells on one side with honeyed ale, and placing it on a hive-floor, and over that an empty hive, or pan;

and setting it about the middle of the apiary. The bees will soon flock about it in crowds, and empty the comb: once in 24 hours replenish it. They will not come out to feed in improper weather, though it continues for three or four days. Troughs of food must be substituted during bad weather. Nor must *public feeding* be practised when other apiaries are pretty near, as the bees of those will equally partake with the owner's. The bees will entirely neglect public feeding, as soon as *honey* can be obtained from flowers.

At a public feeding much quarrelling will happen, between those who *are* feeding, and others that cannot approach near enough to partake for the great crowd; but it will be unattended with mischief—only mere boxing bouts, without using their *stings* as in fatal duels.

Feeding should not be *attempted*, until the robbing season is over. If any stocks before that time are in distress, they should have a trough given them at night, and withdrawn in the morning.

The *weighing*, or *poising* of hives, in FEBRUARY,

BURUARY, to judge whether they require feeding, ought not to be deferred till after they have for some time begun to breed; lest the additional weight of them be mistaken for that of honey, when perhaps there may not be a spoonful in the hive, and the continual increase of mouths produce the speedier famine.

Now and then a trough of food given to the stocks as soon as farina is collected, will forward the queen's breeding, and likewise add much to invigorate the bees to greater activity in their labour.

I weighed a stock November the 2d; it was then 29lb. 3 oz. On February 26th, the weight was 24 lb. 1 oz.—Difference 5 lb. 2 oz. From November 2d to February 26th is 115 days (the weather mild), in which were consumed 5 lb. 2 oz, or 82 oz. which is but three quarters of an ounce per day.

On the 8th of December a stock weighed 21 lb. 11 oz.; the 11th, 20 lb. 15 oz.; the 21st, 20 lb. 8 oz. The difference, from the 8th to the 11th, is 12 oz. i. e. almost an ounce per day. From the 11th to the 31st, 5 oz,

5 oz. is but half an ounce per day. The weather frosty the whole time.

In the first *thirteen* days the consumption was 12 oz. in the *ten* last only 5 oz. On further trials, I found the results nearly similar.

From the whole I have been induced to conclude, that a trough holding about *half an ounce* of honeyed ale, daily administered, is a *sufficient support to any stock* while feeding is required.

Where the price of honey is higher than that of sugar, feeding will be of advantage, though the stocks do not need it. For what sugared ale they will consume, will be a proportional saving of so much stock honey. Besides which, it will cause those stocks, in the next season, to be the sooner fit for storing; and likewise, if it should be rigorous and long, the stocks, nevertheless, would be rejoicing in plenty, while their neighbours would be starving through scarcity.

The feeding of bees, in spring, is of great advantage to them, as it enlivens and strengthens them, and stimulates their activity,

vity, causing them to breed the earlier. A little good ale, with honey dissolved in it, will be very acceptable, even though they should be well provided.

Since the preceding sheets were written, I have found a very eligible method of feeding, by taking a half hive, or box, cutting combs of honey down to the proper depth, and placing them therein, on bars similar to those of the stock which they are to be set over. Loosen the cover, thrust a divider under it, take it off, and then carefully set the half box of combs upon the divider, and immediately withdraw it, and place a cover over the stock. The quantity of combs put in must be proportionate to the wants of the bees, to the time of its application, and the nature of the season.

CHAP. XXII.

OF THEFTS AND WARS OF BEES.

THE bees of apiaries are often enemies to each other, and wage destructive war, compelled thereto by necessity.

The ROBBERING SEASON is sooner or later, as the summer has been more or less favourable; but in general it happens in *March* and *August*. That of *March* is but seldom and trifling: in *August* very frequent and formidable. I once had a stock attacked in this month, and again in *October*.

When swarms have been late, but numerous, or a bad season has followed, it will be a very dangerous time, and make it necessary to contract all the door-ways, as a caution of security. A few bees will defend a narrow pass against a multitude.

As very bad seasons often occur, which prevent stocks from procuring sufficient
honey

honey for their winter store ; reduced to the choice of *starving* or *plundering*, those that are strong chiefly prefer the latter.

This being determined on, they send SPIES to discover the state of neighbouring stocks ; and such as are found to have but few bees, but much honey, are concluded to be proper objects for an attack.

A few of the spies for several days dodge about the doors, trying to get in to obtain more certain knowledge of their strength and riches ; but are driven away by the powerful stocks, who then plant guards at their door, which the weak stocks do not, and therefore are the first to be assaulted. The next day they return in force, and begin a violent siege ; and a desperate conflict ensues, both within and without the hive, neither side giving quarter.

The stoutest warriors make a desperate attempt, and rush forward and seize the queen ; knowing that, by dispatching her, instant victory is the consequence ; for the assaulted bees always desist, and join the victors, the moment they are apprised of their *queen's death*, become as one fraternity,
and

and assist to carry their *own* treasure to their new habitation. But in case the queen is protected, they fight on with rage and fury, and death and pillage soon destroy the stock.

As soon as strange bees are perceived, contract the doors to half an inch; and when an attack is actually begun, stop the doors of *all* the stocks; taking care that no admission can be had, at any chasms, into the hives, till a little before dark; and then open all the doors, and the thieves will rush out and fly home, and the true bees, that were excluded, will enter in.

About an hour after lift the stock up: if it is *not heavy*, it must be taken and set over another stock, by *fuming*. But if heavy, and not much plundered, take it to a dark out-house, and keep it there two or three days confined, with some admission of air.

Very early in the morning shut all the doors, and post a person near the stocks that were most likely to be assaulted, with a kind of battledore, of slight wood, in his or her hand, with which to strike all the bees down that shall appear, and tread upon them. Continue this *sport* as long as any approach,
and

and in a few hours these formidable desperadoes will be destroyed. It will be finished about noon. As the apiator's bees *are all confined*, those killed are sure to be robbers only; but if they should happen not *all* to be killed in one day, keep them still confined, till night, and finish the work next day.

When stocks do not shew resentment against the attempts of the spies, and thereupon keep guard, it is a very suspicious sign of their weakness or poverty. They should be roused to anger by thrusting some twigs into the door-way, which will urge them to revenge, and to guard their door.

But if *not*, take the hive, or the enemy will be sure to strip it. The guard at the doors will continue two or three weeks, if robbers are about.

But when robbers find all the stocks upon their guard, and courageous, after essays for two or three days, they will desist, and retreat to other apiaries in the neighbourhood more favourable to their design.

When a stock has been assaulted, and all on a sudden becomes quiet, with great crowds of bees passing to and fro, it denotes the
death

death of the queen ; on which immediately close the door, and take the hive into a dark room ; and in the evening unstop the door, when the strange bees will take wing for their own home. Then take the combs out, and *save the brood* ; or if the honey or brood be small in quantity, *reserve* the hive as it was left, to *super-hive* a stock next year, or to put a swarm in.

AS SOON AS STRANGE BEES are seen about the stocks, it will be prudent, *if* there are any weak stocks, to unite several into a well-stored hive of honey, which will not only rouse the courage of the bees, but render them too powerful to be conquered.

The bees of good stocks are always very *irritable* and *revengeful*, whenever invaders are on the scout ; nor will they let their familiar friend the apiator at that time approach them.

CHAP. XXIII.

ENEMIES OF BEES.

MANY, various, and powerful are the enemies and destroyers of these industrious and beneficial insects. But a little timely care and attention would prevent or greatly diminish their depredations.

The *Wood-pecker*, or *Tree-creeper*, seizes the bees as they are gathering farina off the fallows in the spring. *Robins* and *sparrows* will boldly wait at the hive door, and catch them as they come out; and sundry birds seize them in their *flight*.

Poultry are very prejudicial to bees, by catching them as they pass in or out of their hives; and their dung is a great nuisance to them.

Mice get into the hives by the large and deep gaps made for door-ways in common hives readily admitting them in winter, to the destruction of the stock. They often also make a lodgment and breed under the

N

crown

crown of the hackel, and eat their way through the top of the hive, to the ruin of the stock. Inspection should be taken to prevent it; and traps set to catch the mice. A good cat, bred in the garden, would devour them. The doors of the hives should be made too low for a mouse to enter, but at least three inches wide.

The *wax-moth* is but little noticed, or even suspected of being, as it is, a very dangerous enemy, destroying many stocks in a concealed manner. The mother moth lays her eggs about the skirts of the hive, if she cannot *elude* the vigilance of the bees, to lay them in the *inside*. She spins a close and strong web to defend the young, who burrow in the floors, and progressively consume the combs, to the total destruction of the bees.

OLD STRAW HIVES, OR DECAYED FLOORS, are very favourable to their depredations. Frequent shifting the hives, and cleaning the floors, will prevent the evil; and will guard against other diminutive enemies, as ear-wigs, wood-lice, and ants. The nests of these should be destroyed; or platters of
honey

honey and water, covered with brown paper, with many holes, which the ants may pass, but not the bees, and tied close round, will entice them to their destruction. *Spiders'* webs should not be suffered about an apiary.

LARGE SLUGS, or snails without shells, creep into the hives in wet weather; and are troublesome to the bees, by hindering their labour, and soiling the hive by their excrements; causing the bees to be very fractious; but they neither consume the honey nor wax; and generally, sooner or later, blunder their way out again: for I very seldom found one in taking a hive up, though I have often seen four or five at a time in boxes. By chance, they sometimes lie against the door-way, and stop it quite up; which may be soon discovered, by the bees not being able to enter. They may be taken out by a sharp-pointed wire in the form of a hook.

WASPS are much more destructive to stocks than their other adversaries, by their superior strength and prodigious numbers; especially in a year favourable to their breeding. They are most numerous in July and

August. Soon after that the workers die ; but the mothers survive the winter, and commence breeding about April. But if cold and wet weather ensues, greater part of the brood are starved ; because the workers cannot fly out for forage, and wasps never lay up any store. Wet is very injurious to their nests ; and therefore, in a long season of heavy rain, few wasps will appear till September. But a mild winter, succeeded by a hot spring, will so favour the increase of wasps, that, without the greatest vigilance, many stocks will fall victims to their power.

One wasp is a match for three bees. They are very bold, and frequently encounter the most evident danger, undauntedly opposing a host of bees, to filch a belly-full of honey. Therefore, when cold weather sets in, knowing that the bees keep no guard then, great numbers get quietly in, and carry off abundance of honey ; and having once tasted of the sweets, they will not desist till they possess the whole. *Perhaps* the same method of destroying them, in this case, as directed for bee robbers, would prove as effectual against wasps.

When

When wasps are seen dodging about the hives, contract the doors to half an inch; and should the bees be negligent in guarding their doors, rouse them to anger by agitating twigs within the door of the hive, which will induce them to guard, and assail the wasps.

In the spring the *mother wasps* may be seen about old timber, with the splints of which they compose their nests. On the blossoms of gooseberries and raspberries they will be found often, and may easily be knocked down and destroyed. Their death, at *that time*, will prevent a like number of nests from existing the next summer. A nest of wasps, naturalists inform us, consists of thirty thousand.

Their *nests* should be sought for by children; who, for a trifle, would seek, and give information of them. Effectually to destroy a nest: In the evening, when the wasps have done labour, repair to the place, and stop all the holes of their egress or regress. Introduce a SQUIB into the chief passage, and, instantly stopping it with a sod, &c. they will presently be suffocated. Dig the nest

up, and burn it. Perhaps a wild-fire, of damp gun-powder, placed on a piece of wood, and introduced, would answer the same purpose.

Another way is, to make a hole in the top of their nest (stopping all the others), and then pouring a quantity of boiling water down. This plan might be substituted for any method by means of fire, where gun-powder might be dangerous.

I have known wasps so abundant, that in one season they destroyed ten stocks, in one apiary, out of twelve. A few shillings, prudently distributed, probably would have prevented this disaster, and diminished their nests next year.

HORNETS, in the spring, will watch the bees as they issue from the hives. When they are seen about the hives, they should be knocked down and trodden upon. They may be trepanned, by placing an empty hive, with its inside smeared with honey, among the stocks. Allured by this, the mother hornets will begin to build therein. In the evening lift up the hive, which may be done with safety, if the mother is there :
then

then set it down again, and in about half an hour after, have a vessel with water ready; take the hive and plunge it a little way into the water; then strike smartly on the top of the hive, and the hornets will fall into the water, and by a pair of tongs may be crushed to death. OR, the hive may be closely stopped up till morning; and then taking it into a room, raise the edge next the window: the hornet will fly directly thereto, and may readily be cut in two by scissars, crushed, or knocked down.

Their nests are usually hung on the rafters, beams, or roofs of barns, or out-houses, or fixed in hollow trees. They resemble a globe of brownish paper.

THE NEST MAY BE TAKEN by preparing a large-mouthed bag, with a running string, to draw the mouth close. On a rainy day, or in an evening, put on the bee-dress, and with great stilness approach the nest, and draw the bag gently over it, instantly pulling the mouth so close, that not a hornet may escape. Separate it from the parts it may be attached to, by a long knife, plunge it into a proper depth of water, and

let it remain till morning. By this time the hornets will be motionless; then taking the bag out, tread upon it, to crush the nest flat. Turn the nest out upon a parcel of straw, which being lighted, will of course burn them; for the water will not kill them, and they will revive. But if poultry are at hand, the cakes of brood may be taken up by a pair of tongs, and laid before the poultry, and they will soon devour the young as a delicious feast. The same may be done with the brood from wasps' nests.

CHAP. XXIV.

EXTRACTION OF HONEY AND WAX.

THE hives should be kept in a warm room, till the combs are taken out; since the honey will drain out the sooner while in a fluid state. Turn the hive upside down, cut through the *ends* of the spleets close to the hive; then with a broad but thin knife cut through the *edges* of all the *combs*, close to the hive, and lift it on a clean board, or shallow dish, having first taken off the straw cover. Then, by a chissel or wedge, force the *body* of the hive up, which will be effected if the ends of the combs have been properly loosened; and by this means the combs will all be preserved in their natural order, as fixed at their *tops* to the frame of bars: disengage them *singly* with the knife, cutting a notch out of each, where it is fastened to the spleet (which keeps the combs all

all in their places) till the last is disengaged. The combs being thus preserved *entire*, lay them in a cleanly manner on dishes, and slicing off the cover of those sealed up, let the honey run out.

The combs of *common hives* cannot be taken out *whole* (though spleeted according to my directions) without an iron *instrument* in form of an L. The shaft to be that of the depth of the hives, exclusive of the wooden handle; the short foot is to be two inches long, and half an inch wide, made sharp to cut both ways; the handle, of wood, four-square. This is to be passed down between the combs to the hive top; then turning the instrument half round, and drawing it to you, the combs will be disengaged from their fastening to the top of the hive.

Proceed then to loosen them from the *sides*, &c. as above directed, and they may be taken out without crushing and breaking them to pieces.

The taking out the COMBS WHOLE, or nearly so, is of great advantage to the preservation of the *brood*, and the purity of the honey; which may by these means be extracted

tracted without mixing the fluids of brood, or dead bees, or any other heterogeneous matter with it.

Carefully separate and preserve the parts of *empty* virgin combs by themselves, for placing in glasses; and those that are black, droffy, or charged with farina or *dead* brood, keep apart.

The FINE COMBS are to be drained and melted by themselves, as being free from any alloy. They may be mashed by the hands, and put upon hair sieves, as being pure virgin honey.

The parts of combs that have brood or farina in them, are to be cut out rather beyond their extent, to guard against the chance of cutting among the brood cells. The *inferior* combs must have all their defiled parts cut out, and *then* be squeezed over sieves, or bolting cloths stretched over sticks, laid over dripping or other wide pans, &c. and placed at a proper distance from the fire, or in a room that has one, for the more speedy running of the honey. But for greater expedition, in large apiaries *presses* are used. The pots of honey should not be
tied

tied down till a few days after their filling, that the small particles of wax or other foreign matter may rise to the top, and be taken off.

The portions of combs that were laid aside as very impure, but containing honey, may be cut, and thrown into water, to make ordinary mead; or brewed with malt, to make what is in Pembrokeſhire called bragget; or elſe ſet before the bees on broad diſhes, &c. but ſpread thin to prevent the bees from ſtiſling themſelves thereby; as may likewiſe the reſuſe combs after draining, and afterwards the veſſels; firſt ſtrewing over them hay, graſs, or herbs, to keep the bees from being ſoiled. They will lick up every drop of honey. It ſhould be ſet before them towards the evening. But if it is not carefully done, many bees will ſuffer by quarrelling; ſo that I think ſmall mead had better be made of them.

Having thus drained the honey from the combs, BOIL THE FINE COMBS by themſelves, with a ſufficiency of water to keep them floating, till they are thoroughly melted.

A *three-cornered* BAG of ſtrong linen cloth,

cloth, tapering to a point, is to be prepared, which is to be held by an assistant over a tub of cold water, while the operator pours the melted combs into the bag; *instantly* draw the top of the bag close by a string, and let two persons press it strongly downwards, between two strong sticks tied together at one end like a flail. Do this repeatedly down the sides of the bag till no more wax issues through. When the wax is cold, it is to be taken from the water, and *re-melted* with very little water, merely sufficient to prevent burning. As it boils, take the scum off as long as any rises, and pour it into proper vessels.

Those that are narrower at bottom than top (the most so) are to be preferred. Rinsing the vessels and all the instruments with cold water *first*, prevents the wax from sticking thereto.

The vessels or moulds for wax are to be placed so as to have the warmth of the fire, with a cloth over them, that the wax may cool *gradually*, or it will crack. When quite cold, turn out the cakes of wax, and *pare* off all the dregs that may appear on the top,

top, or bottom, that it may be clear and marketable. The dregs that are pared off may be re-melted, and will yield a little more wax.

Instead of persons to hold the *bag*, which is fatiguing, it may be slung upon a strong staff, with the ends resting on the backs of two chairs, &c.

Or a four-legged *frame* might be more eligible; high and wide enough to admit a tub of water in the inside; and with strong pegs fixed on the top, at proper distances, for sustaining the bag in the middle of the frame. The bag is to have a running string to draw the mouth together.

The vessels in which wax is boiled ought to be considerably larger than the matter contained; for when the wax boils, it very suddenly rises to a great height, and may prove of DANGEROUS CONSEQUENCE.

A more expeditious method of extracting the wax from FINE combs is, by boiling them alone. Press them slightly down, use very little water, keep them stirring till the scum rises, which take off as long as any rises; but when only froth appears, blow

that aside. When perfectly dissolved pour it into proper moulds, and set it near the fire, covered over, till cold. On turning it out, the small quantity of impurities which has subsided to the bottom, is to be pared off.

If the cake of wax should by chance seem discoloured, re-boil it again without water.

Wax, when taken off the fire, cools nearly as soon as metals; therefore the process should be executed as expeditiously as possible, or a less quantity of wax will pass through the strainers.

If combs are kept a considerable time, without being melted, they will moulder and rot, or the wax-moth will breed among them, and devour the greatest part, and pester the whole apiary.

A hive of three pecks, well filled with full honey combs, of two years standing, will yield in general 25 lb. of honey, and not more than 2 lb. of wax. The average run of common hives is 15 lb. of honey, and 1 lb. of wax.

CHAP. XXV.

CHARACTERISTIC OBSERVATIONS ON HONEY.

HONEY varies in quality, according to the nature of the flowers from which it is gathered.

That from aromatic plants is the best. But often, through very bad weather, the bees are necessitated to collect from flowers of very ordinary and disagreeable qualities; causing the honey of particular situations to be bad, while in other counties at the same time (the weather having been more favourable) the honey was of a very superior degree of excellence.

VIRGIN COMBS *are supposed* to contain none but honey of the finest quality; yet, if the above principle be true, such may be ordinary. *All* combs taken from SWARMS are commonly esteemed virgin: but this is an error, if by virgin is meant the purest and
I best.

best. For every comb, or part of a comb, that has had *farina* or *brood* in it, is thereby rendered impure, so that so much of any comb or combs, whether of *swarms* or *stocks*, thus circumstanced, is not virgin.

This is evident from the *swarms* breeding through the summer equally with the *stocks*, and their combs being equally charged with brood and farina. The wax from such combs will indeed be *finer*, and in *greater quantity* than that of *stocks*. The continued use of the cells in breeding, first soils them, and at length renders them impure; but the cells where nothing but honey has been deposited, and which, when full, have been sealed over, are certainly MOST PURE. As to quality, *that* of virgin combs may be as *ordinary* as that of *stocks*, if both were gathered at the same time, and from the same kind of flowers.

The *older combs* are the weightiest; for the bees will cement the *skins* of the different breeds of maggots to the sides of the cells, to strengthen them, till at last they become as stiff as brown paper.

Old farina and other matters are continually

O

nually an increasing addition to their weight and consistence, so as with difficulty to be separated from the *real* wax, even by a long boiling, and then but partially. Honey deposited in such old combs, necessarily receives a tinge, taste, and some impurities from them. However, *parts* of some combs in old hives, that have been *lately* made, may be virgin.

It is for the reasons above, that a hive of stale combs, though bulky and weighty, disappoints the expectation, by producing, in general, only one pound of wax.

The honey generally brought to the *London* and other markets is mostly foul, and of a coarse quality, from the causes above stated, as well as from the careless and uncleanly manner by which it is *extracted*. The common method is, by taking the combs out of the hives by piece-meal, *indiscriminately*, and mashing them, dead bees, brood, farina, and dross all together; which must needs render it an heterogeneous mass, of a disagreeable and often nauseous taste, and unwholesome in quality.

For

For sieves exclude only the grosser parts; but the fluids of the maggots and dead bees, with many other impure particles, remain intimately incorporated with the honey. By this unskilful management a very valuable and salutary article of diet and medicine has been rendered disgusting and inelegant.

With submission, I would recommend to the nobility and gentry to purchase none but COMBS of honey, to be drained at home. Sophistications and impurities would then be avoided, and such combs might be selected as are fine, or according to their own fancy. Were this condition *insisted* upon, the markets would soon abound with COMBS of honey instead of pots. *The introduction of such a custom* must depend on the patronage of the gentry; without which so useful an improvement will not be likely to take root.

Doubtless the price must be regulated according to the quality of the combs, as in sugar and other articles.

Another benefit may arise from it, the promoting of the IMPROVED MANAGE-

MENT of bees; for as in the common method few, *very few*, fine combs *can* be produced, compared to *that* of storifying; the peasantry would thereby by degrees be influenced to adopt it.

The comparative taste and fragrancy of honey are the best criterions to judge of its excellency. In cold weather it grows hard and grainy; some sorts are of a whitish colour, as that gathered from white clover. In warm weather, or in warm rooms, it will ferment, and grow acid. In some years it is naturally very glutinous and thick, to what it is in others.

Honey, as partaking of acidulous and saline parts, ought not to be kept in vessels glazed with lead, as all coarse ware is, but in stone: for though its effects may not be felt by the strong, it may prove detrimental to the weak and delicate.

Sometimes a white mealy matter will separate, and concrete about pots of honey, which is a real meal or farina that the bees digest with their honey. The *white* attracts the notice, from being the more conspicuous.

Honey may be clarified by putting it into a bowl, and setting that in water over a fire. When it boils, part of the impurities will rise to the top, and is to be skimmed off. The heat, in this process, however, takes off from its fragrancy, and, if properly extracted, it is not necessary.

It may be thought that honey retains the virtues of the flowers from which it is gathered. This may be true in a degree, especially of aromatics; but as it is gathered from a variety of different flowers, of various qualities, the honey must partake of that of the aggregate. We find, whatever flowers it may have been collected from, it still retains its disagreeing quality (though otherwise diversified by flavour and colour), and, if exposed much to fire, loses its fine *smell* and *taste*. Nevertheless, whether it could be deprived of its disagreeing quality, and made as agreeable as sugar, without a diminution of its medicinal virtues, merits the consideration of the chemist.

The *heating* and *gripping* properties of honey probably arise from its *essential oil*, with which farina largely abounds; its detergent

and saponaceous qualities, from a fixed alkaline salt, combined with the essential oil.

It is wonderful, amidst the great chemical discoveries of this age, that this beneficial article should never have been thought of importance enough to obtain an analysis; by which a process might be deduced, to free it from its offending qualities, without impairing its medicinal ones. Probably *such a refinement as is used with sugar* might produce the effect; though with the loss of its fragrantcy and fine taste.

Bees will not feed on candied honey, nor syrup formed of rough-grained sugar, but suck up the liquid part, and leave the granules behind.

CHAP. XXVI.

TO MAKE MEAD.

TO every gallon of water add three pounds and a half of honey. Boil it as long as any scum arises, which skim off. If it boils longer, the fermentation will not succeed so well, nor will the liquor prove so fine.

Pour it into a cooler: at a proper degree of heat, put in a slice of bread toasted hard on both sides, covered with fresh yeast, and with it a little lemon peel, or any other pleasant-tasted substance. Set it in a warm place, and cover it from the cold air. When it has fermented two or three days, tun it up, and slightly cover the bung-hole; *taste* it every day, till it is found to have a *vinous* flavour and smell. Bung it then slightly; and when it appears to have entirely done fermenting, stop it quite down.

If another fermentation should be perceived, leave the vent peg out for some days. Having stood six months, if it is fine, bottle it; if *not*, draw it off the lees, drain them out, without rinsing the cask, and return the liquor into it. Then take a long two ounce phial (such as Bateman's drops or Godfrey's cordial are usually put in), put therein a quarter part of chalk in small bits, and to it a quarter of water: then tying round the neck a piece of thread or twine, let it down into the cask, till its top is on a level with the bung-hole; when pour in about a quarter part of the measure of the phial of WEAK spirit of vitriol, and instantly let it down far enough for the bung to go in; but not so low as for any of the liquor to pass into the phial. Hold the string till the bung is fast in, to secure the phial from slipping down.

Care must be taken, when the bung is to be taken out, to secure the string that the phial may not sink into the liquor. The quantity stated is enough for nine gallons.

The fixed air generated from the phial will gradually pass into the liquor, and not
only

only fine, but tend greatly to preserve it from acidity, and give it the sparkling quality of champagne; taking off the disagreeable lusciousness so common in mead. Having stood four or six months longer, it will be fit to bottle. If any part of the spirit should rise with the fixed air, or by other means get into the liquor, it will be harmless; being often prescribed in medicine. Perhaps sharp vinegar may answer as well.

I conjecture malt and other fermented liquors will equally be benefited by a similar use of the vitriolic acid. Perhaps, if used at FIRST with the ferment, it would answer the purpose much sooner.

Honey is preferable to *sugar* for making domestic wines, giving the lightness, cordiality, and vinosity of foreign wines.

Mead may be flavoured by raspberries, currants, &c. by a proper quantity of such articles, that have been preserved with honey or sugar, being infused into the liquors when set to ferment. A small quantity will *then* flavour a much larger quantity, than a much larger if boiled in the liquor at first.

If the liquor *ferments too long* after it is tunned,

tunned, brimstone thrown on a few live coals, and set under the cask, will presently restrain it, or any other fermenting liquor.

To *promote fermentation*, care must be had that the casks be not shook, and that they be kept warm, excluding much air or light; and with the bung-hole but loosely covered.

For conducting the fermentation with success, the rule is to stop it at the vinous state, before it commences to be acidulous: for, if not fermented enough, it will be foul, mawkish, and not keep; if too much, it will then turn sour.

The practice of vintners is to scent their casks with the match, viz. for a pipe take four ounces of brimstone, of burned alum one ounce, put in a pipkin, and held over a chafing dish of coals till the brimstone is melted and runs. Slips of canvas or coarse linen are then dipped into it, and the powders of nutmegs, cloves, and corianders, instantly sprinkled on them, and then fired, and let down at the bung-hole, and the fumes kept within the vessel as much as possible.

This prevents the ropiness of liquors, and a dissipation of spirits, and consequent weakness,

ness, arising from the imbibing quality of *new* casks.

When vinous liquors become flat, they may be restored with spirit of wine, and with raisins and sugar, or honey. These articles soon render them brisk, and sparkling, and restore their strength.

The juice of elder-berries will communicate a fine claret colour and taste. An agreeable roughness may be also given by the juice of ripe sloes.

CHAP. XXVII.

A SUMMARY OF MONTHLY MANAGEMENT.

AS the most natural, it will be proper to begin our BEE YEAR with

October.

This month requires no other superintendence, than some casual observations, viz. that the stocks are not attacked by robbers (for this, though not common in this month, sometimes happens); and that no insects or vermin harbour about the hives.

November.

It is proper to clean the floors, or rather to exchange them for clean and warm ones. Cover boxes, especially about the tops, with matts or straw. If any stocks are light, feed them, which in this case must be continued through

through the other cold months. Clear away cobwebs, weeds, and vermin.

December

Requires a continuation of the same precautions. If an uncommonly severe frost happens, secure them effectually with coverings, and close the doorways ; leaving only a very small vacancy for fresh air. And in snowy weather it is to be attended to that no bees may come out.

January.

The same directions are to be observed as for the two preceding months.

February.

Feel the weight of the stocks : those that feel light feed daily, till honey-gathering arrives. If two or three troughs of honied ale are given each of the stocks in this and the following month, it will contribute to forward the brood.

March.

As soon as the bees begin to work briskly, the floors should be again shifted, and
every

every annoyance about the hive taken away. Early in the morning will be the properest time.

Those stocks that appear to be very numerous (if the weather be *mild*) should be duplicated.

April.

The flowers in this month are often replete with honey, and the stocks with young bees, so that swarms are sometimes emitted; to which attention is to be given.

Through the windows of boxes may be seen whether honey is carried in, and then feeding may cease, unless on a change to bad weather. Observe to *double* all the stocks.

May.

The weather in this month is mostly very changeable, so that light stocks require still to be fed, when it is unfavourable, even to the last day of its continuance. If the weather is hot, take off the additional coverings put on in the other months. Be sure now

to let the bees have a plenitude of room for breeding; better too much than too little. But if the weather is cold, misty, and damp for several days, and not attended to, famine may be the consequence.

This month generally furnishes many swarms: therefore constant watching is requisite from eight till three; or otherwise great part of the prime swarms will escape.

June.

By tapping on the sides of the duplets, it may be known whether they want the addition of a triplet. About the latter end of this month it is likely it may be necessary to take off some triplets, and to set nadir hives under.

Be very circumspect with regard to the stocks that have *not* swarmed.

July.

Swarms often rise till the end of this month; and therefore the bees must be watched till all the hives have sent out their prime swarms. Take hives off, and place nadirs under, as often as may be requisite.

About

About the tenth, the upper doorways of duplets must be stopped.

If the weather is so hot as to endanger the melting of the combs, give the hives as much air as possible, and screen them from the sun, and pour water upon the ground around them.

August.

This is a dangerous month for robbing. Therefore an observation must be had every day, to see whether the hives are assaulted. By neglecting that, many stocks are frequently lost. Wasps are to be guarded against.

About the latter end of this month is the usual season of *general deprivation*, or taking up of stocks. Instead of taking off duplets in this month, it would be better (I think) to defer it till the latter end of the next month, or beginning of October.

September.

No other attention is required than a casual cast of the eye, to see that the stocks are not annoyed by robbers, or vermin.

PART

PART II.

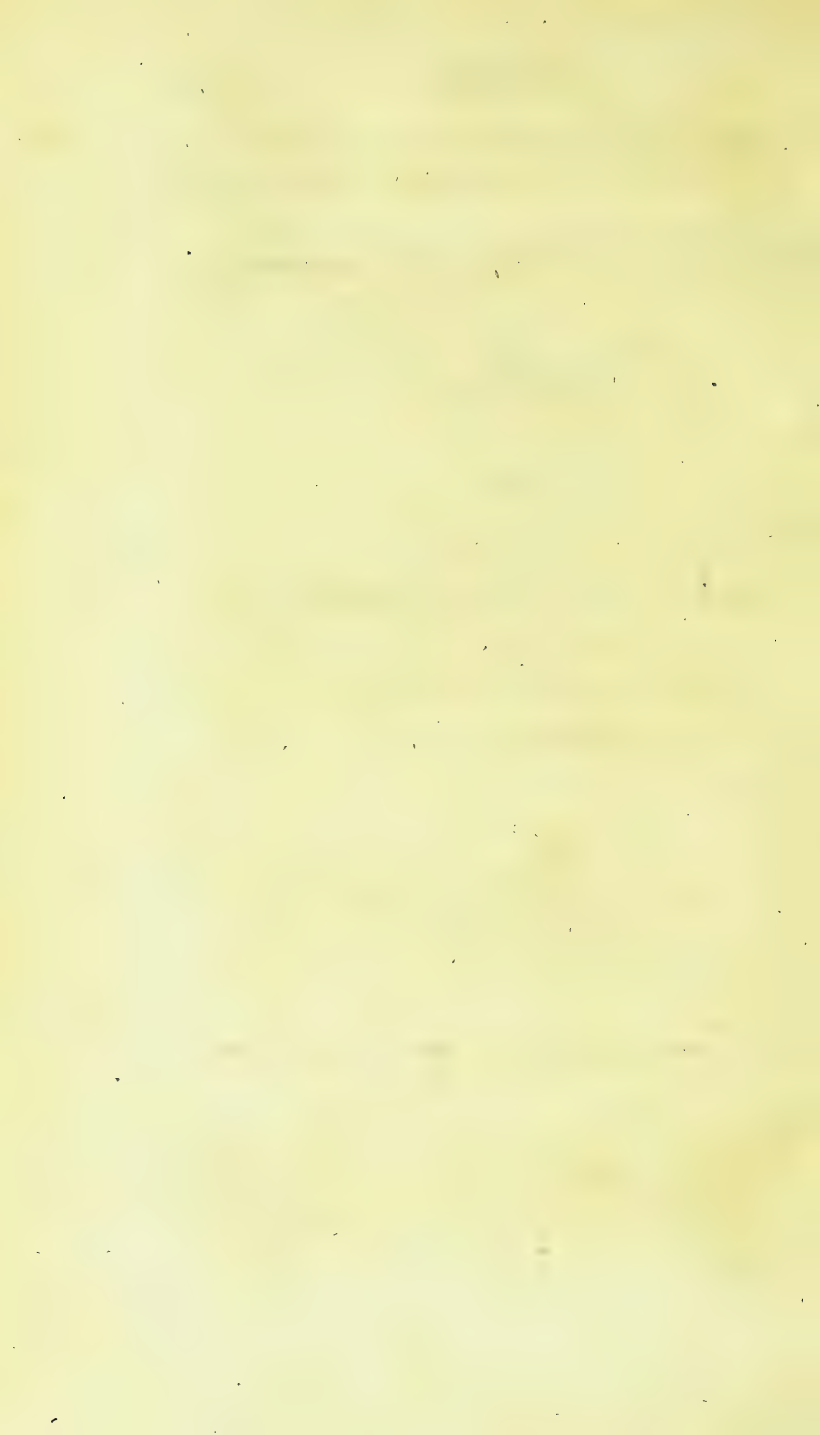
INSTRUCTIONS

FOR

PERFORMING

THE

OPERATIONS.



GENERAL RULES.

I.

TO put on the bee-dress whenever an operation is to be performed; for although not always necessary, yet it will be prudent to be prepared against the worst, especially for the unexperienced. For a foot may slip, or an accident happen that no human foresight could be apprised of. Great care should be taken after the dress is off, of coming near the bees, as they will be eager to sting, for three or four days, though the person be at a considerable distance.

II.

Before any operation on a stock, stop or shut the door-ways, and be sure to unstop them as soon as it is over, unless where it

is otherwise directed. The best material, as well for this purpose, as for stopping crevices, is long shaggy *moses*, found on banks under hedges.

III.

Though the operations are directed to be performed in the morning early, or in the evening as soon as the bees are all at home ; yet by the use of the *dividers* they may be done at any hour ; in cloudy mizzling days ; when the bees are out at their labour, or have been previously shut in very early in the morning.

No. I.

INSTRUMENTS OF FUMIGATION

ARE, first, a Box, pl. 1. fig. 4. adapted to this purpose, of the exact *size* of the boxes in use. It must have a close bottom, nailed to the edges, and without crevices.

On one side a round opening must be cut to receive the mouth of a quart TIN POT from within; and at such a distance that the pot may not be nearer than *an inch* from the side, and *three inches* above the bottom.

The QUART POT, without a handle, is to be punched round the sides as full of holes as possible, within an inch of the top (except about two inches, which need have but few), as also in its bottom. The holes should be as large as those of a flour-dredger. The pot is to be fixed in the circular opening by flat-headed tacks, with the part having the fewest holes next the bottom.

Another APERTURE is to be cut on the right of that for the pot, six inches in length and four and a half wide, to receive a pane of glass; it is to have a shutter to let into a bevel at top, and rest on a ledge at bottom, and to fasten with a button. A wooden or cork stopper must be fitted to the pot. It will make the box more convenient for vision, if a small window three or four inches square is made in the *back*, about three inches distance from the bottom.

OBSERVATIONS.

Without a great quantity of holes in the pot, each at least one-eighth of an inch in diameter, the matter for fuming will not burn freely, and will thereby hinder the effect designed. The pot is placed an inch from the side, that the bees in falling may not lodge or be obstructed in their passage, and thereby *scorched*. For a like reason the pot is three inches above the bottom. The circular form of the pot prevents any considerable number of bees from being detained thereon. The part on one side having few

holes, is for laying the fuming substance on.

Annexed to the FUME-BOX is a *frame*, pl. 1. fig. 5. to nail on its edge. It consists of a *hollow square*, the rim three inches broad, and three quarters of an inch thick; the inside hollow, to be equal to that of the box; the other parts to extend over the outside.

This frame is intended for placing *full boxes as well as hives over it*; and therefore, to suit it to that purpose, its *corners* have four small pieces of wood fastened in, to adapt it to the circular bottoms of the hives. By the breadth of the *rim*, it will likewise admit any common-sized hive.

OTHER INSTRUMENTS are, a long thin and broad *knife*, with a square end, and a square wooden handle:

TWO BRASS PLATES, OR DIVIDERS, and *two slips of double tin*, of the same length as the plates, and three inches broad; or in lieu thereof, two old saws without handles, and their teeth taken off.

No. II.

The Material for Fumigation.

IN my former treatise I slightly mentioned a method of *stupefying bees*, but have since that time heard that some persons on trial could not succeed.

Having always been in a habit of *driving*, I did not give the subject that attention which it so justly deserved. But reflecting on the great advantages it was capable of could the difficulties be surmounted, I studiously applied to experiments, to accomplish this desirable end, which I now submit to my apiarian friends.

The SUBSTANCE best adapted for this purpose is the *Lycoperdon*, or great puff ball. It is likewise called frog cheese, mully puff, punk-fist, and by various other names; but I shall mention it only under that of PUFFS, in the sequel.

In good soils it frequently grows as large as a child's head; commonly as large as the
double

double fist. There is also a small sort, about the size of a small apple, but of a very weak quality.

Both sorts grow on dry pasture grounds, and in woods; and thrive where mushrooms do, and nearly about the same time, or either sooner or later,—or sometimes not at all.

They are to be gathered in *dry* weather, if possible, and as soon as full grown, which is in about eight days. They then begin to turn brown and powdery, and are *then* most fit for the purpose. But if not come to their growth, when dried, they become too hard to hold fire. Presently after the puffs are gathered, expose them as much as possible to the sunshine to dry; or for want of that, in a dry shade, &c. secure from wet or dew. Drying them by the *fire* makes them hard, however moderate the heat.

Care must be taken to preserve them dry, in paper bags, in a dry room, till they are wanted. For as they seldom come in season early enough for use, they should be preserved in readiness for next summer. They are to be laid on the hearth for an

hour or two, the evening before they are to be used, to expel from them the dampness their sponginess makes them liable to; which would render them unfit for burning freely. Age likewise has the same effect, bereaving them in part of their stupefying power. Puffs found in autumn in woods, or under hedges, being dried by a moderate fire, though not so good, may do for want of better. Puffs kept longer than the second year, retain little virtue.

Those puffs which in a dry season have become mature, light, and dry, burn the *best of any*. The lighter and more *spongy* the puffs are, the readier they burn. Those that are gathered in, or soon after, wet weather will be very tardy in burning, being deprived in a great measure of their virtue, however dried afterwards; as will those that have been dried, but suffered to get wet again, but which redrying will not restore.

When a *wet* season, or any other cause, has hindered the acquisition of puffs of a good quality, they should be steeped in a *solution of nitre* (salt petre) in water, viz. a

tea spoonful of nitre grossly powdered, to a pint of water. After the puffs are soaked therein, they are to be well dried, and, thus treated, will quickly take fire, and retain it.

But if puffs are very bad, rub a piece of camphor, of the bigness of a pea, to powder, and then add a little linseed oil. This being smeared lightly over a puff, will immediately take flame by a candle; blow the flame out, the puff will continue to hold fire, and fume till reduced to tinder.

It is to be noticed, that moist dry puffs will readily hold fire in the *open air*: but when introduced into a close box, excluded from fresh air, they CEASE TO FUME. And should fresh air be admitted, it would counteract the stupefying quality of the fume already admitted, and delay the operation, or make it wholly unsuccessful; therefore the least fresh air possible should be admitted.

No. III.

The Method of Fuming.

TAKE as many pieces of puff, each about the size of an egg, as the fume pot will hold without pressing; lay the pieces on embers, or live coals, in a chaffing-dish, or the like: when they appear to fume well, put them nimbly into the pot of the fume-box, and immediately stop the mouth. The hive or box of bees being *previously* set over the box (with all crevices stopped, that no smoke may escape), in about fifteen or twenty minutes the bees will be STUPEFIED, and fall from their combs into the fume-box. This will the sooner happen if the hive or bee-box is now and then gently tapped on the top. When the smoke first arises, it causes a great buzzing among the bees, which gradually ceases as they become senseless; and then they may be heard to drop

drop down, and will recover again in about the same space of time on the admission of fresh air, and without receiving the least injury.

A slight fuming will at all times render them very peaceable, though not quite insensible.

A small portion of brand may be laid on bad puffs when they are first put in, lest they should not retain the fire. *The stupefying bees is in no wise prejudicial to them, since they soon return to their wonted labour and activity, as if no such operation had been done. Nor do they afterwards show any resentment upon that account, which is always the case after driving.*

No. IV.

A Method for Cottagers who are not provided with Dividers.

MAKE a HOLE in the ground something less than the circumference of the hive, and
eight

eight inches deep ; spread a cloth to cover the bottom and sides.

In the evening take a stick seven inches long, having a slit in its end to receive a piece of puff about the size of an egg ; light it, stick the other end in a clod of clay, and instantly place a hive of bees over it ; and they will become as easily stupefied as when suffocated by brimstone. If one piece of puff is not sufficient, put in two or three upon sticks,

No. V.

OR, instead of a hole, a circular RIDGE OF EARTH, nine inches in height, with the inside hollow, and suitable to support the hive, when set over it. Leave a *part* of the ridge open to put in a fuming-pot, which may be a small earthen pan, an old tin pot, or the like, in which put the lighted puffs, and cover the pot with an old funnel (the pipe off) with many holes in it, to keep the bees from falling on the burning puffs. Immediately

mediately on putting the pot under, stop the opening by a sod of earth, made ready for that purpose. If the puffs should not hold fire, run a wire, or small stick, through the sod, to let in a *little* fresh air.

Or, an EMPTY HIVE may be used for this purpose, in lieu of the earth; turning the hive upside down, and setting another thereon.

Or, the ridge of earth may be made on a board, and so be more convenient to be removed near the hives.

If the hives are not of equal circumference, two sticks, of the due length, with two others nailed across them, and laid over the hive, pot, or kettle, will conveniently suit any hive you have.

These methods are designed for storified hives ONLY; it being of *no use* to save the bees of single hives.

No. VI.

The Use of Dividers.

IN SEPARATING STORIFIED HIVES, thrust in one of the brass dividers first, with its turned end *upwards*, between the two hives; then shove in the other with its *turned end downwards*, and slide it under the first. At the same time, an assistant is to keep both hives from slipping out of their places. When the apiator withdraws the upper divider, and hive thereon, the assistant is firmly to keep the *under* divider from moving with one hand, and with the other keep the under hive steady. The apiator, in drawing the hive towards him, must move his hands gradually under the divider, till nearly half is withdrawn; he will then feel it upon a poise, still keeping the divider close up to the hive, lift it gently and carefully up, and set it on the fume-box, placed by him in readiness. The assistant, in the mean while, is to place another empty hive
over

over the stock in lieu of that taken off, or a cover, as the case may require. Keep the hand on the cover, or empty hive, and withdraw the divider. If the divider do not easily come out, use a pair of pincers.

Sometimes the irregularities and snags of the broken binding or straw of the hives greatly obstruct the free entrance of the divider. To obviate this, it is proper to have two SLIPS of double tin, fifteen inches long, and four wide: they are to be shoved in on the right and left side of the hive; introducing them at the middle of the sides, and not at their ends, they will then generally pass easily. But if any impediment occurs, run a broad knife between the edge of the hive and the tin, and raise it a small degree at the point of obstruction. Or, if it arises from the under hive, the knife is to enter *under* the tin, to disengage it. The slips having passed nearly to their whole *width*, the dividers are to be shoved in at the *back* or *front* of the hive, as shall be most easy, and *under* the slips; by which means they will enter with great facility. Observe to turn their ends as before mentioned. If the dividers enter at

Q

the

the back, a person must hold his hand against the door-way, to prevent the stopping from being shoved out.

Particular care should be had, in taking out the dividers, to set them upright against some support, or to lay them flat, to prevent their being *bent*, which would render them unfit to keep the bees close in.

No. VII.

To Storify.

To *set on* a DUPLET, loosen the cover of the stock, and slide a divider underneath it, keeping one hand on the cover. Take it off as soon as the slider is adjusted ; then set an empty hive upon the divider, and keep the hive fast while it is withdrawn. Early in the morning, or in the evening, will be the properest time to do it : a pair of gloves only will be needful.

To place a DUPLET UNDER a stock, set a stool behind the stock ; shove the divider
under

under it, then lift the hive and slider on the stool; set an empty hive (with its cover off) and floor in the place of the stock, which lift thereon; pull out the slider with one hand, while the empty hive is kept steady with the other.

A TRIPLET is to be managed in the same manner.

No. VIII.

Deprivation, or Separation of Hives.

FIRST, a TRIPLET is to be taken in the evening. The dividers are to be introduced, as by No. VI.; the separated hive is to be placed on a floor, at some distance, and then the door unstopped. In about an hour after, or the next morning, if the bees in the triplet are quiet, as also those of the stock, there are queens in both; but if not, shut the door of that taken, and set it over the fume box, and proceed to fume, as by No. III.

If an under or nadir hive is to be taken from a *double* or *triple* hive stock, the same method is to be used ;—only the two upper hives are to be taken off together, and placed on a stool till the nadir is taken away, and then set on a fresh floor in its old situation.

Second Method of taking Triplets

Is, for a stout man to lift up the triplet, stock, floor and all, and take them to some apartment, in which a strong form or bench is firmly prepared close to the wall, and to place them on that. It may be done any time in the morning, if the bees are very early secured from coming out. Follow the directions of No. VI.; only the operation may be more securely done, without being incommoded by the bees of the apiary, when at a distance from them; and being against a wall, the hives are kept more steady during the insertion of the dividers. If the middle hive seems full of combs, and has not much brood, that also may be taken.

On the GENERAL DEPRIVATION, the
hives

hives taken off must be set apart in another part of the garden, to discover which have queens; as also of the stocks. And if any are without, the hive taken from it must be restored, and remain some weeks longer. The further fumigation is to be deferred till the next day after taking. It is to be noted, when hives are *lifted on the fume-box*, it should be *on the divider*, which is then withdrawn, by which means no bee can escape. The stupefied bees are always to be put in an empty hive, and placed before the stock, on some support.

TO SEPARATE DUPLETS, is so obvious from what has been written, as to preclude further directions.

COTTAGERS must pursue the methods of No. IV.

Many times the EDGES of STRAW HIVES will be so uneven as to suffer the bees to pass under them, so as to be very troublesome on the introduction of the dividers. To remedy this default, prepare a narrow slip of coarse linen cloth, about three inches wide, and of a length somewhat more than the

circumference of the straw hives in use. Two small wire hooks are to be fixed at one end. This cloth is to be thoroughly wet, and drawn round the body of the hive, about an inch and a half above the bottom edge. When the dividers are to be used, raise the edge of the cloth, just high enough to suffer them to pass a little under, and let the cloth drop close round. Its weight will render it so close as to exclude any bee from passing.

It will many times happen, that a few bees will still remain in the hive, notwithstanding the most powerful fumigation, by having secured themselves in the empty cells; or by the fume not being strong enough when *first* put in. In such a case, throw a cloth over the hive, and take it into a dark room, there to remain till the next day; when gently drumming or tapping on the sides and bottom of the hive, they will rise to the edge of the combs, and fly home, without shewing any anger.

When a hive is cleared of bees, the brood combs should be properly placed in an empty hive, *inverted on a divider*, and so placed

over

over the stock. This must be done very leisurely, lest it provoke the bees to destroy the young. If one hive will not hold them, put the residue in another, which set over some other stock.

Boxes are much easier separated than hives, from having their edges more even, though the like obstacles will sometimes happen; and which are relieved by the same means as for hives. But the use of tin slips will not be requisite.

It will be advisable for the unexperienced to practise the manner of operation by trials on empty hives with a weight laid over them, before they attempt with hives of bees.

Care must be taken, that as few bees may be killed as possible; especially where the queen's death would be the ruin of the hive.

COTTAGERS should separate the combs from the bottom hive the night before, by a knife; when they are to take the hive off, give it a kind of twist, and then lift it on the ridge of earth, as by No. IV. while a person *instantly* throws a cloth over the top of the hive left, there to remain till next morning;

then placing the edge of the straw cover just under the cloth, shove it nimbly and closely with the right hand, while the cloth is kept smooth with the left ; by which means the bees, and pieces of combs, that were lodged on the top, will be pushed off by the sliding in of the cover. But if the cover does not fit close, stop the chafms with moss till cold weather comes, when the obstructions may be pared away with a knife.

No. IX.

*The Re-union of Swarms with their Stocks, or
with each other.*

HAVING hived a recent swarm, take it to a distance from the apiary, lay a cloth on the ground, and strike the edge of the hive thereon ; the bees will fall out in a lump. With a spoon tenderly divide them into three or four parcels, putting them into as many pans, sieves, &c. and set each parcel at a

considerable distance from each others' sight. Those parcels which have no queen will soon return home again. That which remains take to a darkened room, and fume, as by No. III. This done, turn them out upon a table, and with a small stick disengage a few at a time from each other, and look attentively for the queen. If not found in the first number, strike them off the table into an empty hive, and thus proceed with the rest. When she is found, instantly seize her between the finger and thumb, and put her into a phial with a notched cork, and about a dozen workers with her, to keep her warm and easy. *Inspect* the remainder of the parcel, lest there should be another young queen. Include them all in one hive, and set them down before the stock, to which they will gladly unite.

But should a queen not be found, it is possible she may have fallen down, and been crushed. In that case the bees will soon shew their inquietude, and return home. If not, give them a slight fuming, and proceed as before, but with more circumspection.

Keep

Keep the captive queen two or three days, when, if there should be no occasion for preserving her, death must be her portion. For, if let loose, she will return to the stock, and occasion a repetition of the process. Or else make an artificial swarm with her, if wanted.

By the like means, AS MANY SWARMS as rise may be added to the stock, or united with *one another*, to form a powerful stock of themselves. Only *then* keep the bees in the hive, with a cloth over it, and take them out by a spoonful at a time, to examine them, pulling the cloth over after every spoonful, to prevent their reviving too soon.

OR, SWARMS may be united, three or four, or more, together, to form a stock, as directed at pages 99 and 100, or at deprivation time.

When two queens rise together with a swarm, and are hived, but prove hostile to each other, fumigation will reconcile them. The first queen that recovers will be acknowledged, the other slain.

If a swarm that is to be united is tumultuous and mischievous, the giving them a flight

slight fuming will make them more tractable. It is worth remarking, that bees are often adverse to receive strangers at one time, but will cordially receive them at another; therefore they must be humoured.

No. X.

Captivating the Queen of a Stock.

FUME the stock, and examine the bees, as in the foregoing article. Sometimes *she*, as well as some other bees, will evade the effect of the smoke, by entering the empty cells (which is equally the case even with brimstone), and therefore must be proceeded against as before directed. To distinguish a queen, a previous knowledge should be acquired, by inspecting the bees that have been suffocated. A queen may be attached to any part, by passing a silk thread round her neck, and clipping off part of one wing. Where she is fixed, the swarm will surround and never quit her. Or a queen may be capti-

captivated thus: Put the bees that have a queen into a hive or box, whose top has long flits of *only five thirty-seconds* of an inch in width. The working bees, by much tapping on the sides of the box, or by blowing the smoke of tobacco in, will issue out, and leave the queen behind, as she will not be able to pass the flits, if accurately made.

No. XI.

Outliers to recruit weak Stocks.

AT the close of the evening, place a floor on a level with, and to touch that of the outliers; bring the *weak* stock pretty near; then with a small stick very leisurely stroke the out-liers down on a vacant floor. Instantly take away the stock, and set it at a little distance, while an assistant places the weak stock over the floor of out-liers, its edge being kept raised by a wedge. Let them remain till day-break, by which time the idlers, in all probability, will have ascended;

cended ; when, taking away the wedge, replace the stock in its former situation, and the other at a considerable distance.

But when a great quantity of bees cluster round the body of a hive, an empty hive should be placed near ; when lifting the stock upon the empty hive, idlers and all thereon, they will soon find and embrace the new accommodation.

Another method is, to spread a cloth underneath, and by a brush or watering pot *sprinkle water* over them ; by which means they will be unable to rise, and may be brushed off on the cloth, and put on the floor of an empty hive, and the weak stock over them.

No. XII.

To unite a queenless Stock to another.

WHEN a stock in *summer* has lost its queen, stop the door immediately, till the other stocks have done work, *then* open
it

it for about an hour, and then stop it again; slide under it the divider, fume it, put the bees in an empty hive, and set them over another stock. By this means, as they gradually acquire vigour, they will assimilate with the stock, without any disturbance. The hive of combs taken most likely will have much brood therein, which is to be disposed of as before mentioned, and what honey there is is at the owner's service.

No. XIII.

To unite weak Stocks or Swarms in Autumn.

IF, through inadvertence, weak stocks or swarms have been retained till autumn, and one of them has a sufficient winter's store, incorporate the lightest with the strongest, by fuming each separate, and then placing the weak one over the other. When the bees recover, they will unite without strife, and the supernumerary queen be cast out. If they are both poor in honey, but strong
in

in numbers, they will form a good stock, if a good hive of honey is placed over them. Otherwise, suffocate them, and take the honey, and save the brood, if any.

Cottagers may unite them by turning one hive bottom upwards, in a cold day, for several hours, till the bees become chilled and feeble: the combs are then to be taken out severally, and the bees brushed off upon a table, and the queen taken from them. Then put the bees into a pail, pan, &c. lay two sticks across, and place the other hive over it; close the joining with a cloth, all but the door-way. Let them stand thus two or three days, in which time they will have united. If afterwards the hive should be found too light, the bees should be fed.

After all, this is but a shift, which seldom answers. Had they been incorporated in summer, they would have turned to good account.

No. XIV.

Driving.

PASS a divider under the hive to be drove, and then tie a cord across it and the divider; turn the hive upside down on an empty hive, bucket, or something convenient. Place the fume-box, reversed, over the hive, (first taking the cord off), and gently withdraw the divider, taking care that the door of the hive is well closed; then with two sticks beat, as though drumming, on the sides of the hive (all but that side next you) and at the bottom, not very hard, but very quick, ceasing a little at intervals. In about fifteen minutes the bees will begin to be terrified: hearken whether they make a great buz, and whether a buz is likewise in the box, for by that it may be guessed that many are ascended. Some one should hold the box steady while the drumming is made, or it will shake, and let the bees out. The box may then be safely lifted up on its side opposite to the light (for the room should

should be almost dark), and the bees will fly directly towards the light. Hold the box steadily between your side and arm, and with the other hand continue tapping round the sides. The bees by this become tame, and will gradually crawl up from the hive into the box, with loud buzzing; and the more so when the queen ascends, for then the rest will *soon* follow; but till that happens they rise with great reluctance.

By chance a few may be left behind, which may be drummed out the next day.

If no fume-box or divider is provided, a common straw hive may be used instead; and the stock lifted on it (when inverted) over night. In the morning, stopping all chasms and the door, tie the two hives fast with a cord, and invert them, and then proceed as above.

The driving of bees renders them very peaceable and tractable, so that they may be safely taken up in the hand; though not so completely as by fumigation. They may be turned on a table, severally divided, inspected, and *the queen taken from them*. But this peaceable disposition continues but a little

while in either method; so that the operator must be as expeditious as possible. Except when the bees are kept in an empty hive two or three days, it will make them extraordinarily tame.

DRIVING WILL BE USEFUL as a succedaneum for puffs, in seasons or circumstances when they cannot be had.

TO NATURALISTS it may be of advantage, by enabling them to investigate the properties of these wonderful but irritable insects, while in a state of vigour, more satisfactorily than by *fumigation* or *immersion*.

No. XV.

Show-Box for Amateurs.

THIS BOX, OR FRAME, is to be made of rattan or mahogany, without top or bottom. It is to be nine inches high, and two and a quarter wide, clear in the inside, *exactly*; and twelve long. There is to be a pane of clear
glass

glass on each side, as large as the frame will admit. The glasses are *not* to be let into a rabbet, as usual, but to slide up from the bottom to the top within side, under four small tenter hooks, and stopped at bottom by a small screw, so that the glasses may be taken out occasionally. There are to be two half-inch *shutters* on the outside, to fasten in a bevel (not to slide) at bottom, and with a button at top.

The top is to have a bar one inch wide, and the full length of the frame, and is to be let in at each end so as to be flush with the top, and at half an inch distance from each side of the box.

A door-way is to be cut at one end, one inch and a half long, and half an inch high: this is to be esteemed the front. At the other end or back, a like door-way is to be cut; and another three inches higher.

On the top edges of the box are to be two narrow slips or ledges fastened; between which are to lie (not to slide in a rabbet) two pieces of glass, each half the length, and sufficient in width to cover the top between

the ledges. A wooden loose cover must close the whole.

It must have a *loose* FLOOR two inches *wider* than the box; and little abutments should be added at the corners near the bottom, to give the box a steadiness sufficient to prevent its being turned aside.

OBSERVATIONS.

THE narrowness of the box, and its having but one bar, is intended to prevent the bees from making more than ONE COMB, which they would do if it was a *quarter* of an inch wider.

By being confined to *one* comb, the minutiae of their transactions are exposed to view on both sides; the queens not excepted: a discovery I suspect not to be so fully obtained by any other means known to the public.

A window, full south, is the properest to place the box in. A situation the least exposed to wind is necessary for their succeeding. The bees are used to great heat, and
commu-

communicate much themselves, which causes a great indraught of cold air to be very prejudicial and discouraging.

I invented this box in the year 1783, when removing to this situation (which is an extraordinary windy one, beneficial to my own health, but not propitious to bees); and not having a convenient aspect to fix the box in, the wind greatly impeded their labour, and frustrated my designs; except one year, which being tolerably favourable, my purpose was in *part* answered.

The two door-ways in the back of the box are the readier to introduce troughs of food, in case the bees, through bad weather, are hindered from collecting, after being first put in, or at any other time. The two back door-ways are to be always close stopped when not used.

The reason why the panes of glass are not to be fixed in, is, that in case of accidents they may easily be repaired.

No. XVI.

Management of the Show Box.

PROCURE a slip of deal, of the length of the box, one inch and a quarter broad, three quarters of an inch thick : pierce small holes in it, at equal distances, four on a side, into which put eight slight sticks, four or five inches long, and thus form a stage, cutting off all irregularities at the bottom. Place in it a *thick empty virgin comb*, four or five inches in length and breadth. Introduce it as far up the middle of the box as to touch the bar ; fasten it at the ends by two fine and long screws, passed in at the front and back of the box. *Or*, the stage may be hung to the bar by four strings (horse-hair will be best) over the bar let into grooves, and tied on the side of the bar, that there may be no obstacles above the level of the box.

Having procured a QUEEN from a *swarm*, cut her wings half off, put her into the box at the top, the door being stopped ; then put a PINT of *fumed* bees, including ten or twelve

twelve drones, into the box with her. A less number of bees than a *pint* will be too few; and a greater will so much crowd the comb as to prevent the view designed. Close the top by one half of the glass, and the other by a perforated piece of tin. Whenever the door is unstopped, both pieces of glass must be laid over, or there will be too great a draught of air. Throw over them a cloth, and let them remain till the morning; then unstop the door so as to admit a passage of two bees at a time. If on the second day the bees seem contented, entirely unstop the door, and give them a trough of food. Refrain from opening the shutters for four or five days, and then but seldom, till they have begun to collect, and repair the combs, or it will disgust them, and cause a desertion of the box, which will sometimes happen notwithstanding.

For the queen and her subjects, being used to a much greater heat, to a larger society, and a more commodious habitation, will be very much displeased at such a scanty tenement, and not soon reconciled to it.

But however disgusting it may be, if the

queen *does crawl* out, or her subjects swarm out, the one must drop, and the others, though clustered on something near, must *return*, and the queen may be found under the window, and again returned into the box. The cluster, being secured, is to be introduced to her.

If great winds annoy them very much, they will emigrate, though they have enriched the box with honey and brood. The cluster that settles may be shook into an empty hive, and shook out again upon a table, and the box placed near them, when they will soon join the queen.

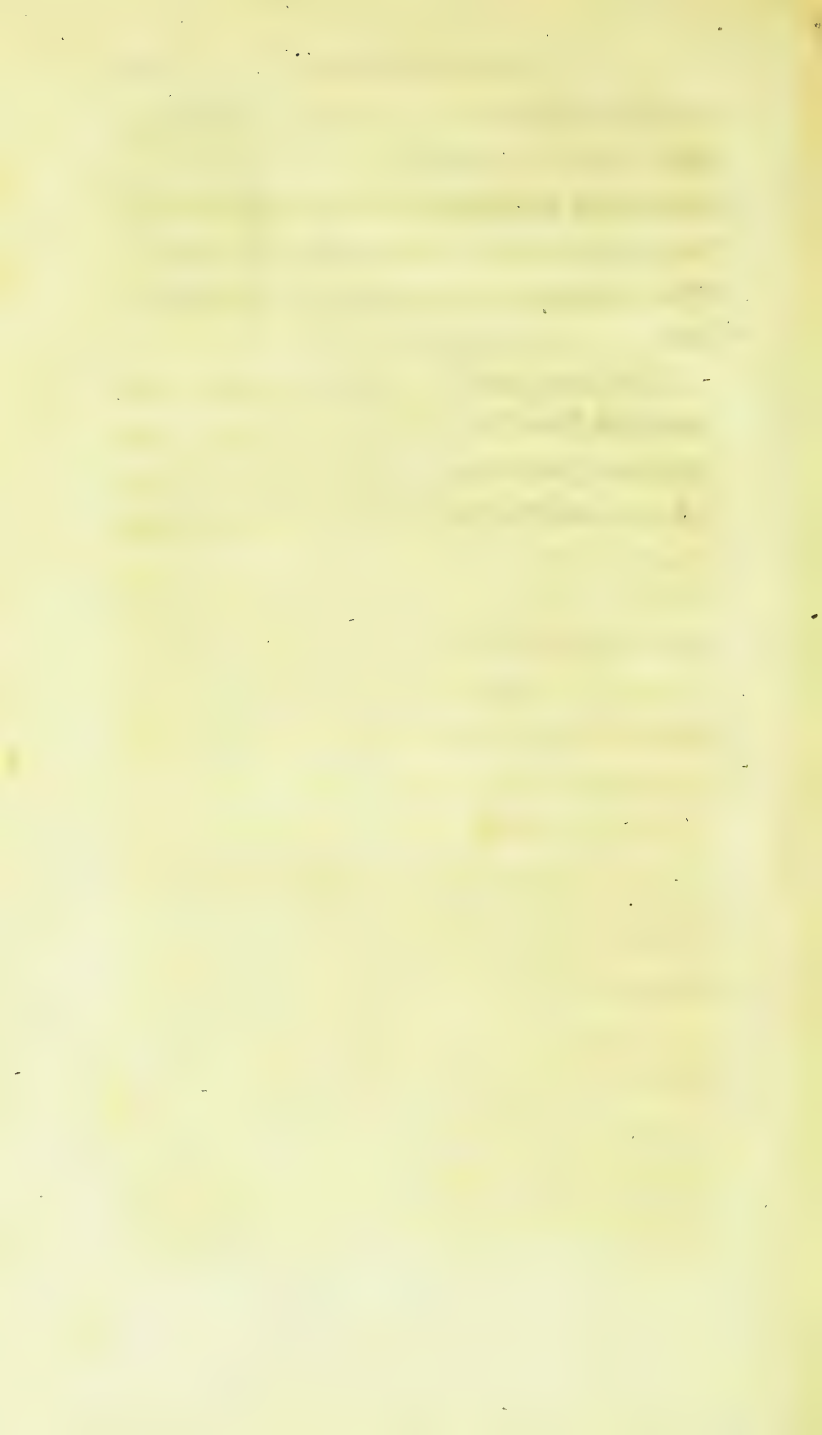
For the purpose of excluding the wind, it is advisable to have a tin trough, of the shape of a T; the long end to fit the doorway of the box, and to be open at the other end, as well as at the ends of the cross tube. Corks are to be fitted to them, that either of them may be stopped in the point from which the wind blows.

When the weather proves cool and chilly, cover the box with a woollen cloth.

When the bees are wanted to relinquish the box, slide a divider under it, and set it

over the fume-box ; shove the box as near the edge of the hollow, as its width, and withdraw the slider the like width, and the bees will have a free opening to fall into the fume-box. Fume them according to art.

The box must be set on a board in the window, and so that no bee may have egress to the room ; observing the like precautions as before advised for window boxes.



POSTSCRIPT.

JUST as my manuscript was ready for the press, I became acquainted with a Treatise, recently published by Mr. *James Bonner*, of Edinburgh, purporting to be "*A New Plan for speedily increasing the Number of Bee-Hives in Scotland,*" &c. Upon a careful perusal, several passages in that work seemed worthy of notice; but not to alter the body of my own, I here give them separate, with a few brief remarks.

Mr. *Bonner* is a stickler for the *Schirachean* doctrine of raising young *queen bees* at pleasure, in order to form *artificial swarms*; and opposes those of a contrary opinion, though fortified by numerous experiments of respectable naturalists, at home and in Germany, several years after those of *Schirach*.

The

The subject of dispute is of little consequence, as not being advantageous for the *general* use of those who seek the best method of producing the most honey and wax; nor is it eligible for the purpose it was designed for, viz. Artificial swarming.

The champions of both sides express their doubts of its general benefit. B. himself, in particular, says, "It is not a great number of hives that will produce the greatest quantity of honey and wax, but only real good ones. I also doubt whether more hives can be reared by *this method*, as our bees generally produce more queens naturally, than they are able to supply with a sufficient number of common bees to compose a swarm with, as appears from their killing the supernumerary ones;" and therefore he "prefers natural swarms."

Schirach's method is by a double hive, and the bees are compelled to ascend into the upper one by the smoke of rags, &c. A piece of brood comb is cut out, of four or five inches diameter, containing a maggot or maggots, precisely of three days old, and properly placed in an empty hive, together

ther with part of a comb of farina, and another of honey: about a quart of bees is then to be introduced, and the hive stopped up, except a small passage for air, and so remain three days. There will be a great tumult and noise in the hive for some hours, when it will subside, and the bees will begin to build a royal cell. The fourth day an opening is to be made of a quarter of an inch, that the bees may come out leisurely. After roving about for some time, they will return to their hive. It should be done in the spring.

B.'s process is, I think, an improvement: he *drives* the bees out, then cuts a piece of comb out that has several maggots, of various ages, and placing, &c. and then sets the hive at a very considerable distance from the apiary, *without stopping the bees in*. This I understand to be B.'s method, for he seems reserved as to an explicit explanation. I make no doubt but the use of the *puffs* will be found preferable.

Shirach's stopping the bees was ill judged, and what, perhaps, occasioned my bad success.

It

It is somewhat strange that Mr. B. should have pursued his researches, without the advantages of bee-glasses, or bee-boxes, but confined himself to *straw hives* of the common form holding two pecks and a half, and occasionally eeks.

His principal *dependance* for rearing a great number of stocks, is by providing a *sufficiency* of pasturage adequate thereto; but the waxen castle he has raised for this purpose seems to have been built on a hill of sand.

He supposes a person to begin with five stocks, which the second year will be increased to ten, and so continue to increase in a duplicate ratio for ten years, which will then amount to 2,500. He supposes likewise, that if each parish of Scotland had twenty hives in May, the amount of the eight hundred parishes would be 16,000. Supposing each of these hives to throw out one swarm in September, we should have 32,000. On these principles, with proper management and tolerable seasons, in the space of seven years the stocks would increase from 32,000 to 2,048,000; and after his draw-backs, his lowest estimate is a clear
million,

million, producing 4,000,000 pints of honey, and 1,000,000 pounds of wax.

On the supposition that bees will increase double every year, and therefore that five hives the first year may increase to ten the second year, &c. I will not dispute : but will there be *double the quantity of honey and wax* ? I doubt, not : for, supposing the five hives (the bees of them) can only collect from the vicinage, as far as their flight for pasturage usually extends, enough to fill their five hives ; the second year being increased to *ten*, the same quantity of flowers will only yield the same quantity of honey, admitting the season similar to the first. I infer, therefore, that the produce will be no more, though double the number of bees. To this we may add (which B. acknowledges) that seasons are often bad ; rendering hives impoverished instead of increasing, and that they often die in the winter. The second link of this golden chain being broke, down falls the whole mass of honey and wax appending thereto, and there I leave it.

No ! say its advocates, that is not fair !
We can increase the flowers in proportion
to

to the number of bees. Can the cottagers extend their land? or will they extirpate from their little allotment the vegetables of their daily support, to give place for bee-flowers? Will gentlemen (whom B. chiefly addresses) plough up their grass and corn lands, to cultivate such flowers? Surely corn and cattle are of more value than honey! We had better be without honey than bread. But B. has a resource in heath, which covers, he says, *more than half of Britain!* If true, I am sorry to hear it; and hope most part of it will speedily be ploughed up for corn, though it should prove the ruin of this *new plan of increasing of bees*. I should sooner prefer Virgil's method of raising bees from a dead heifer, or of Sampson's procuring honey from a dead lion.

I sincerely hope, as Mr. B. has been a practitioner for twenty-six years, he has accumulated a snug fortune, to compensate for his labours and ingenious discoveries. But as his native land so much abounds in white clover, heath, furze, &c. it is wonderful that honey sells at ten-pence and twelve-pence

pence per pound, at Edinburgh. It is also observable, that he gives no account of the produce of his own apiary, and only five instances of other persons', of whom he bought honey and wax. To *one*, in particular, he paid five pounds for ONE HIVE, which was weighed in the market-house of Edinburgh; but unluckily he omits the weight or dimensions of the hive. The reader, therefore, is left to his own calculations.

Mr. B. besides his grand resource of flowers, relies on *preserving the bees* of the stocks taken, and uniting them with the stocks left.

I think his ingenious method of swarming deserves a place here; and I recommend it to a trial, as it will be too late for me to do it. My work, I hope, will be printed before the season arrives; and my age, and increasing infirmities, forbid a longer delay.

“ Suppose one drive all the bees out of a
 “ hive, and thereby make an *artificial swarm*.
 “ If the old hive has a royal cell in it, by
 “ introducing into it about five thousand
 “ bees, they will hatch out the young queen,

S

“ with

“ with all the eggs and nymphs in the cells,
“ and render it a flourishing hive. The
“ method of introducing the common bees
“ is as follows : Let a strong out-lying hive
“ be removed from its usual situation, about
“ ten A. M. and place the hive that has no
“ bees on the spot where it stood ; the bees,
“ on their return from the fields, will enter
“ it, and finding plenty of honey, and abundance of eggs, will rear up the young bees
“ with great alacrity.” But here it may be asked, Suppose there happens to be *no* royal cell in the old hive, how are we to proceed ? On my plan, instead of *driving*, I would *fumigate* them out ; then inspect whether there is a royal cell ; and, if not, return the bees into the hive. But if there is a royal cell, cover the hive of fumed bees with a cloth, and let an assistant take it to some distance. In the mean time, carefully examine the old hive, to be assured that the queen is not left behind among the combs, as she is frequently one of the last that falls. Being satisfied on this point, place it on its original stand. The bees, on their return, &c.
—The hive with the fumed bees should be confined

confined till night, to be certain that the queen is with them; for, if not, they will soon shew it by their uproar, and, in consequence, must be taken before the stock, and set bottom upwards. But if they remain quiet till night, take them to a very considerable distance, in another garden or field. An empty hive should be set in lieu of the combed hive, during the operation, to amuse the bees as they return from the fields.

As Mr. B. approves the Shirachean doctrine of a common egg being capable of becoming a queen by the nursing of the workers, why should he insist on there being a royal cell in the hive? when common eggs would serve the purpose; only causing a delay of a few days before a young queen, so reared, would be capable of laying eggs.

Another method he gives of artificial swarming is, “ to take all the bees out of
 “ the hive, and put into it a considerable
 “ number of common bees, who will hatch
 “ out the brood, and rear them, and often
 “ succeed very well. But this plan is liable
 “ to some imperfections; for, from the time

“ the old queen is taken away till the young
“ one is fit to lay eggs, will be twenty-five
“ days; during which space not a single
“ egg can be laid. To which add eighteen
“ days more, before the eggs can be of any
“ service. It is evident that the best part
“ of the honey season will be over, and
“ consequently, by autumn, the hive cannot
“ be replenished with bees. If I intend to
“ kill a hive of bees in autumn, it seems
“ best to take away the queen at the end of
“ July, leaving a great number of bees in
“ the hive, which, having but few bees to
“ nurse up, would collect a greater quantity
“ of honey in that period, than if they had
“ a queen to lay eggs.”——

“ In the spring, having two hives that
“ had but few bees in each, I put the bees
“ of one hive into the other, suspecting, as
“ they had both bred slowly, there might
“ be a defect in one of the queens; and
“ hoping that, by putting them together,
“ the least healthy would have been killed;
“ but the workers of both hives kindly
“ united. On turning up the hives twenty
“ minutes after, I perceived a few bees clus-
“ tered

“tered together. On a close inspection, I
 “observed the two queens struggling toge-
 “ther with the utmost fury. Being afraid
 “of the ruin of both, I separated them, and
 “kept them asunder, though they ran with
 “great fury along the table in search of
 “each other. I then took the one that
 “appeared the boldest, and put her again
 “into the hive, where she was kindly re-
 “ceived. When a duel takes place between
 “two queen-bees, the workers commonly
 “kill one of the queens themselves.”——

“In November, December, and January,
 “bees eat very little food, as any person
 “may be convinced by weighing their
 “hives in the beginning and end of these
 “months. But if he will weigh a hive in
 “the beginning of March, and likewise at
 “the end, he will find a considerable de-
 “crease; for the bees, having now much
 “exercise, eat more honey in that month
 “than during the three cold ones, and
 “three times as much in May as in March,
 “owing to the increase of brood.

“In a mild winter they eat more
 “than in a cold one, which enables them to

“ *hatch earlier*, and increase the number of
 “ bees in the hive. In a very cold winter
 “ many stocks die; whereas, in a mild one,
 “ very few. In the midst of a severe frost
 “ I have often seen my hives with young
 “ brood in them: they are, therefore, not
 “ inactive, but *breed* even before they carry
 “ in loads.”——

“ About Lammas, those who live where
 “ bee vegetation is early over, especially if
 “ they keep numerous hives, ought to re-
 “ move them to the neighbourhood of heath
 “ grounds, if they should be even six or
 “ eight miles distance; and allow them to
 “ continue in that situation till the heath is
 “ out of bloom. The risk is, if the wea-
 “ ther turn out bad in August, the trouble
 “ will be lost.” [Is there no risk of robbers?]
 “ When bees are placed in a new situation,
 “ they should not be permitted to come out
 “ of their hive for the first time in cold wea-
 “ ther, but kept close prisoners for a day or
 “ two, or many will be chilled to death in
 “ searching for their new settlements.”——

“ Very little ground will keep many bees
 “ abundantly at work. *One* acre of land
 “ would

“ would not be overstocked with twenty
 “ hives, and, consequently, the twentieth
 “ part of an acre would keep *one* !”—[This
 statement seems vague and unsatisfac-
 tory.]

“ *Swarms* should be covered with a cloth
 “ till the heat of the day is abated, lest they
 “ should be urged to rise.

“ Nor should it be omitted to keep a watch
 “ over them, as they sometimes rise after
 “ being two or three hours in the hive, and
 “ though they had begun to work—perhaps
 “ to settle in another place they had previ-
 “ ously prepared. Sometimes, though sel-
 “ dom, a swarm will fly off, notwithstanding
 “ every method that can be used to prevent
 “ it. This happens only in very calm wea-
 “ ther, when bees have had liberty, some
 “ days before swarming, to roam about in
 “ search of a habitation to their liking;
 “ which if once they find, it is difficult, and
 “ often impossible, to prevent them from
 “ emigrating to it.”——

“ If the rays of the sun have been inter-
 “ cepted by a cloud, or shower of rain, in
 “ the time of swarming, the swarms will

“ probably be small, as preventing the
“ greater part from issuing. In which case,
“ let the swarm be placed where the mother
“ hive stood, for about a quarter of an hour ;
“ in which time the bees that are returning
“ from the fields, will soon make the swarm
“ large enough ; and then the swarm should
“ be removed to a mile distance, to pre-
“ vent the bees from going to the old stock.
“ When bees are separated from their mo-
“ ther hive by driving, or when the hive is
“ shifted from where it formerly stood, they
“ are insensible of the change, and always
“ fly back to their former station ; for which
“ reason, every artificial swarm, or rein-
“ forced hive, is to be set at a considerable
“ distance.”—[Would not removing them to
a dark room, and confining them a day or
two, produce the like effect ?]

“ A swarm that escapes from the apiary
“ to a habitation they have previously
“ chosen, usually fly to it in a direct line.
“ The bee-herd should run or ride within
“ sight of them, as fast as he can ; and if
“ obstructions hinder him, he should atten-
“ tively notice the point of the line, and
“ keep

“ keep or recover it, to march therein
“ straight forward, regarding the bushes and
“ hedges as he goes, lest they should be set-
“ tled thereon. But otherwise the line will
“ probably lead him to some apiary, where
“ he may claim his swarm. I know for cer-
“ tain, that a swarm will not fly a mile to an
“ empty hive ; whereas they will fly four
“ miles to take possession of an *old one* with
“ combs in it.”

It is proper here to remark, that Mr. B. represents the setting of an old hive of combs in a person's own garden, or apiary, as a fraudulent practice ; as such hives may allure his neighbour's swarms to settle therein. So may a field of good pasture allure his neighbour's cattle or sheep to feed thereon. What, then, must he not have better pasturage than those in his vicinity ? If strange bees visit his hive, which he set, *bona fide*, to entice his own swarms, should any escape unperceived, and his neighbour's bees take possession of it, *without* being followed by a person who saw them rise, he seems to have a *good title* to keep them ; for who can swear *whose* property they were ? They
should

should have been better watched. The loss they deserve for their negligence, which I hope will make all bee-owners more careful in this point, if for no other reason. No honest person will refuse the restoration, if they can make good their claim. If a person sets such hives with a view of trepanning his neighbour's swarms, it is certainly wicked. The *motive* constitutes the crime.

“ Driving of bees, to make artificial swarms,” Mr. B. observes, “ is very profitable, when properly performed by skilful *bee-masters*; yet it always has been, and ever will be, destructive to bees, if performed by unskilful persons. And, indeed, all new beginners may be almost certain of ruining some hives in their attempts.”

T. Wildman corroborates the assertion, by saying, “ It is an *art* not speedily attained; yet, till it is, the destruction of many hives must be the consequence, as every one will find, on their first attempts to perform it.” To which truth, J. K. sets his seal!

Mr.

Mr. Bonner, it seems, has been a bee-manager from his youth; and is now a professor of the art, and proffers his service to the gentry of his country, who may be desirous of his assistance. He appears to be a successful pupil of the elder Wildman, and like him enumerates several *manœuvres* that he can perform, &c. but he does not, like Wildman, divulge the secret of HOW, which he reserves for his own use. However, we may shrewdly guess, that it is by means of the bee-dress, by driving, and by the management of the queen-bee; by which, to my thinking, any intelligent person, conversant in practice, may easily do the like, if any one would compensate him for his time and trouble of amusing them, which is the only use these feats seem adapted for.

In a few words—Notwithstanding Mr. B. confidently assures his readers, that his plan is “no *chimera*, or *Will o’ the wisp*,” many of them, perhaps, may require more solid proofs on which to establish such an idea. The more wonderful any thing offered for our belief is, the stronger should be

the evidence. It seems requisite they should know what number of stocks B. as well as some of his principal pupils, keep: the quantity of ground sown with bee vegetables on purpose: what the quantity of wild bee flowers is in the circuit of their flight: and what the *produce* is, on an average, for several years, &c. Till this is done, *those that have little faith, but much reason, will still doubt, if not disbelieve.*

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Given the only female and mother -
worker - neuter
Gives the males - but circumstances
of copulation uncertain.
Quoted Reaumur

Under the cover true fast 1787-8

